The NATIONAL GEOGRAPHIC MAGAZINE

Vol. XX FEBRUARY, 1909 No. 2

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PUBLISHED BY THE NATIONAL GEOGRAPHIC SOCIETY
HUBBARD MEMORIAL HALL
WASHINGTON, D. C.

SUBSCRIPTION, $2.50 A YEAR SINGLE NUMBER, 25 CENTS

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AN ILLUSTRATED MONTHLY, published by the NATIONAL GEOGRAPHIC SOCIETY. All editorial communications should be addressed to GILBERT H. GROSVENOR, Editor the NATIONAL GEOGRAPHIC MAGAZINE. Business communications should be addressed to the National Geographic Society.

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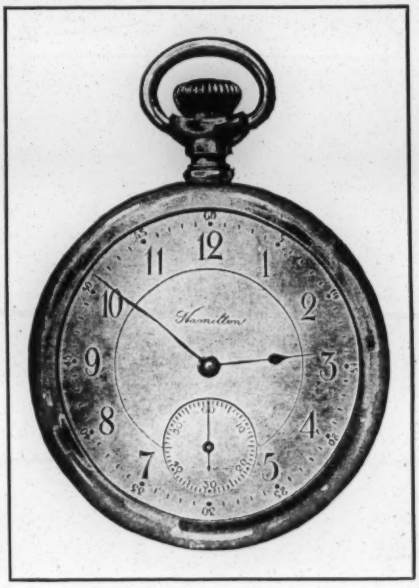

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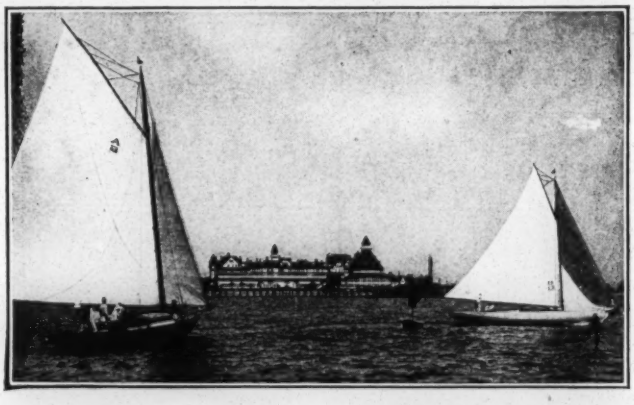

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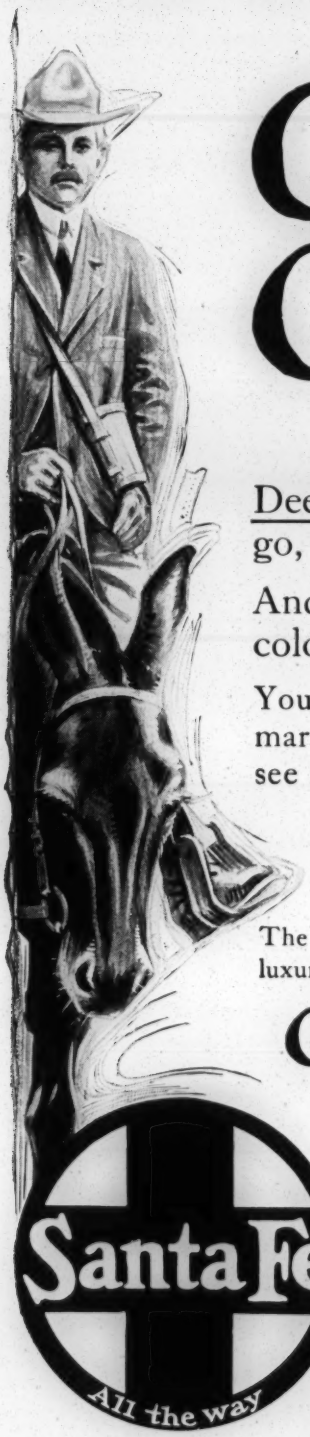

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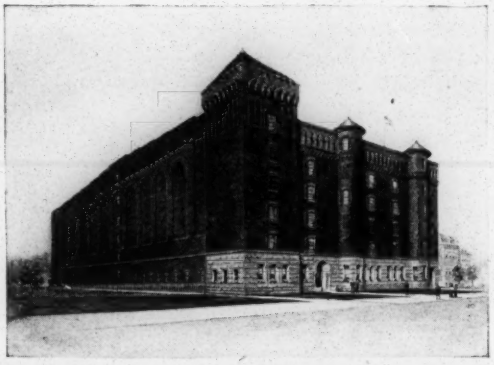

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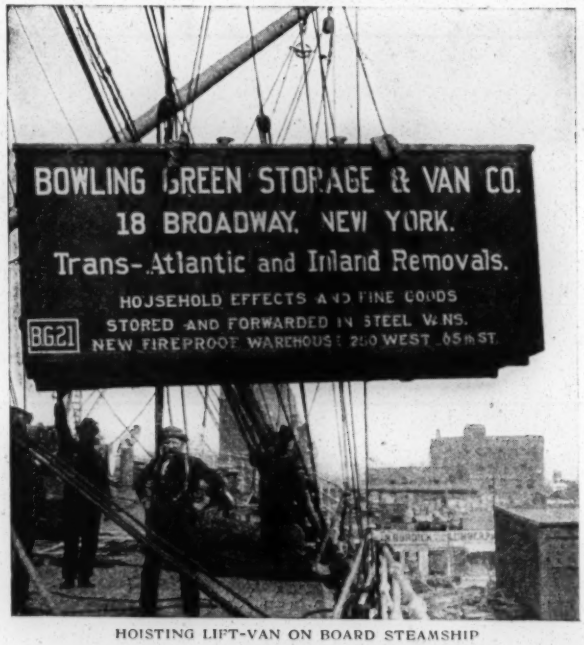
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THE NATIONAL GEOGRAPHIC MAGAZINE

KALEIDOSCOPIC LA PAZ: THE CITY OF THE CLOUDS

BY HARRIET CHALMERS ADAMS

With Photographs by the Author

ALIGHTING from the train at Alto La Paz, I looked in vain for the city. A railway station, three old-fashioned stage coaches awaiting city-bound passengers—but where was "La Paz de Ayacucho," the metropolis of Bolivia?

On either side of the track a dreary brown plain seemed to stretch unbrokenly to the snowy range of the Andes. There was not a trace of verdure, not a single habitation in sight beyond the forlorn little station-house. It was bitterly cold, for Alto La Paz is 13,000 feet above the sea, and while my fellow-traveler attended to the luggage I walked rapidly along the road, hoping to "thaw out."

Suddenly, to my amazement, I found myself on the brink of a deep canyon, a cut in the plain, heretofore imperceptible. Across the gorge the mountains towered skyward, while far below, in the narrow valley, lay a red-roofed city. A steep, serpentine wagon-road led from heights to valley, and on this highway I could discern moving objects toiling upward.

It quite takes one's breath away, this unexpected view of La Paz, and on intimate acquaintanceship the place retains the unique charm of this first impression. No other New World city resembles it, and it has few rivals on earth in picturesque diversity. Although protected from the icy blasts which sweep across the bleak plateau above, La Paz is a city of the clouds, elevated nearly two and a half miles above sea-level, and the traveler bound thither will do well, when equipping, to prepare for a land where it is *always* winter.

Until recent years highland Bolivia was a hermit republic, reached only after a long and difficult overland journey. Now one can climb to the Andean uplands by rail, and this year can even descend from Alto La Paz to the city by trolley. The local color, however, has not as yet been greatly marred by that buccaneer and despoiler of natural beauty, modern civilization.

On leaving the heights our stage driver decided to win in the race to town and lashed his mules into a gallop. I sat on top of the coach, expecting to have a splendid view, and held fast to the seats' railing—and my breath—as we dashed down the steep, zig-zag road. We won the race, even arriving intact, but alto-

AT THE RAILROAD STATION: LA PAZ

gether missed the scenery, as the coach was enveloped in a cloud of dust during the entire journey.

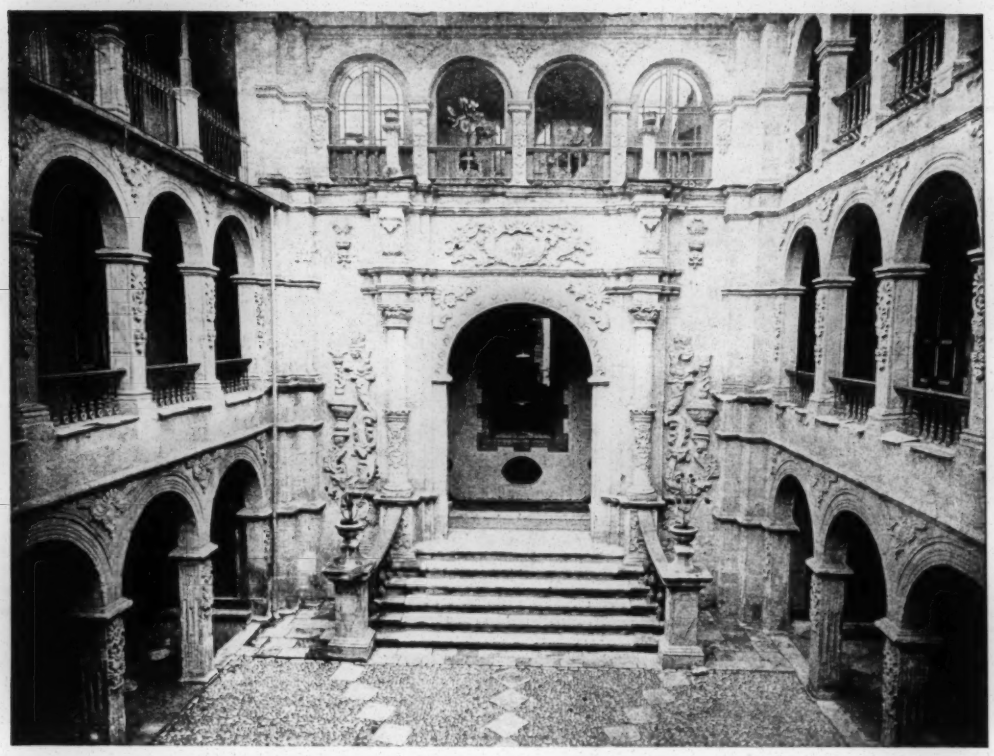
Our lodging place, an annex of the Hotel Guibert, was a stately old edifice, evidently the residence of a Spanish grandee in the days of the vice-royalty. A crest surmounted the doorway and a massive marble stairway connected the inner court-yard with the dwelling rooms above. Our windows opened on a narrow Old World balcony, overhanging the street, from which we next day viewed a passing play of great interest and variety —a play staged and costumed by a master hand.

The curtain was rung up in the early morning, distant trumpeters announcing the prologue. Hurriedly throwing on a dressing gown, I rushed to the balcony to see the Bolivian regimental band marching down the hill. For a half hour the brilliantly uniformed soldiers played in the plaza opposite our windows, and sweeter music I have never heard. In the clear highland atmosphere the notes had an unusual quality. Often in a minor key, the music seemed expressive of the sorrows of the Andean people rather than of their victories.

As the soldiers marched away the water-carriers gathered by the fountain in the center of the plaza, filling the immense copper jars which they carried on their backs. They were Indians, full-blooded Aymarás, descendants of a people conquered by the Incas. The origin of their ancestry is shrouded in mystery, but many ethnologists believe them to be descended from the earliest American aborigines known to us, the builders of Tiahuanaco, now in sand-swept ruins not far from Lake Titicaca.*

The costume of the water-carriers was certainly unusual. It consisted of jackets and short trousers of homespun,

* See NATIONAL GEOGRAPHIC MAGAZINE for September, 1908.



COURT-YARD OF THE HOTEL IN LA PAZ, FORMERLY A COLONIAL MANSION

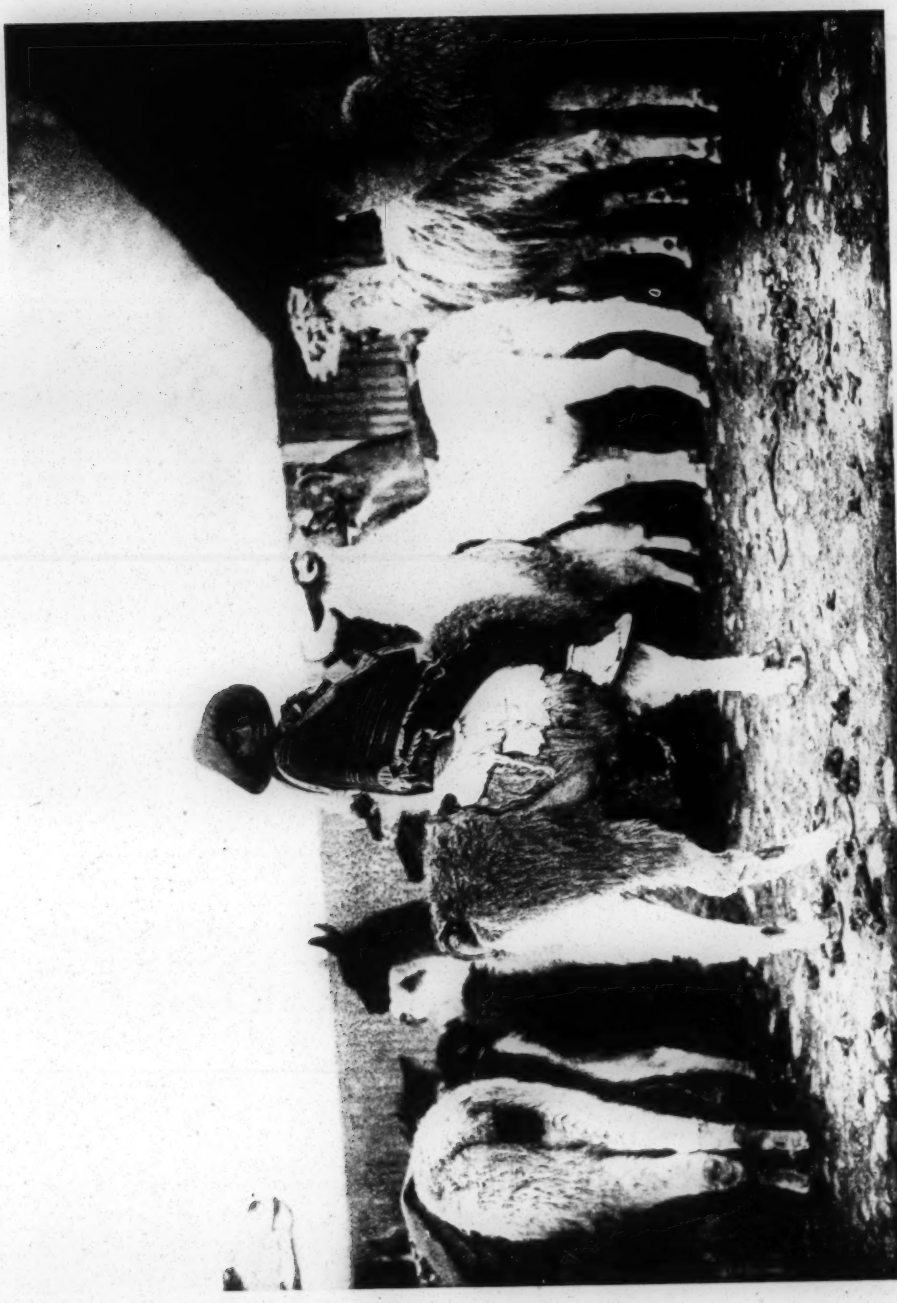
the latter slit at the knees and pieces of cotton cloth inserted, permitting greater freedom of action in hill climbing. The men were bare-footed, but their heads were well protected from the severe cold by skull caps of vicuña wool worn underneath felt hats. These caps and the woolen ponchos covering their broad shoulders were multi-colored, and with the shining copper jars they presented a gay figure. The skin of these Andean highlanders is a russet brown in shade, the hair straight and black, while their features bear a striking resemblance to those of the Tibetan on the Himalayan plateau.

As the water-carriers started up hill on a trot, bowed down under the weight on their backs, we had an "intermission for refreshments." Unlike a breakfast in the States, this early repast consisted only of thick, sweet chocolate and unbuttered rolls, served in our room by a *pongo*.

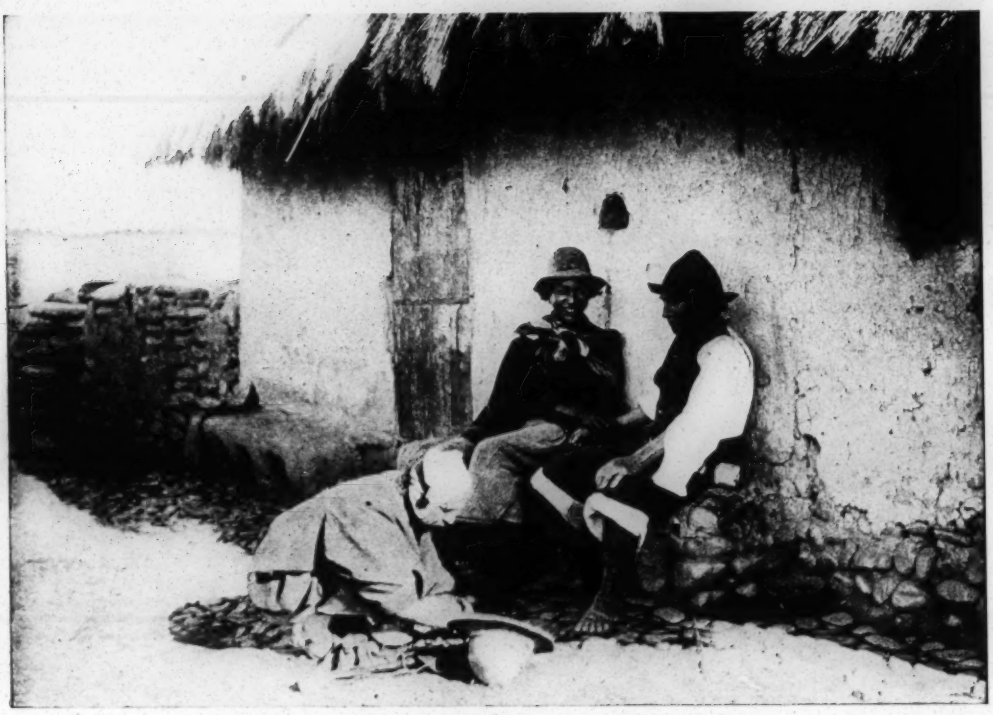
This odd character is an Aymará, who is a relic of the Colonial days, when the cruel *repartimiento* and *mita* systems were enforced by the Spaniards. The *repartimiento* was the distribution among the natives of articles of European production—a source of oppression and fraud. The Indians were obliged to pay exorbitant prices for articles utterly useless to them. Far more oppressive and cruel was the *mita,* consisting of forced labor in the mines and plantations, where the poor Indians died by the thousands from over-exertion and ill-treatment.

Another sort of compulsory labor was domestic service in the homes of provincial authorities and priests. These house servants were called *pongos,* and a modified form of this service exists today in La Paz. A friend of mine, who rented a house in the city, found that one of these servants went with it, a new one for

ON THE HEIGHTS OVERLOOKING LA PAZ: MOUNT ILLIMANI IN THE DISTANCE



ON THE ROAD TO LA PAZ



IN THE HIGHLANDS OF BOLIVIA, NEAR LA PAZ

each week in the year, as her landlord sent his country employees into town, one by one, for a week's holiday. The *pongo* performed odd services about the house and slept on a mat in the courtyard, guarding the entrance. Some of these men had villainous faces.

My friend was desirous that her mother in New York should visit her, but the man of the house was not as enthusiastic over the plan, so he sent on a photographic group of the family servants, the *pongo* well in the foreground, and the mother-in-law indefinitely postponed her visit.

The *pongo* who served our breakfast had evidently just arrived in town, and the broad grin on his stupid face betokened enjoyment of his vacation. He could not speak Spanish, and we possessed little knowledge of the Aymará tongue, but his never-changing smile and our wild gesticulations answered all purposes.

The sound of shouting in the street brought me back to the balcony to see a llama-driver urging his flock down-hill. Slowly and gracefully the strange little mountaineers descended, casting furtive glances to either side. Stately, silent-footed, wearing an expression of great curiosity, the llamas, with their big cousins, the camels, are the only burden-bearers with pride unbroken. They carry their heads with a regal air. In coloring they are black, brown, tan, or white, often wearing a brighter touch in ear ribbons and small ornamental bags hung about the neck.

No sooner had the llamas departed than I beheld, crossing the plaza, the gorgeous Bolivian belle of my dreams, the Chola girl. My impulse was to rush down to see if she were real. Of mixed Indian and Spanish blood, the Cholos form the greater portion of the population of La Paz. Industrious and loyal, the men are good citizens and excellent

A STREET PEDDLER OF LA PAZ

soldiers. The women are often merchants in a small way, but devote most of their attention to personal adornment.

It is all a question of geography, and while the London "Arriet" spends her earnings on her bonnet and the East Side New York damsel pines for imitation jewelry, the Chola's petticoats are her pride and wealth. She wears one over the other, each of a different brilliant hue—twenty-five, I believe, is the record. Short, plump, and bright of face, with two neat black braids hanging from under a round straw hat, her head is as attractive as her pretty little feet. She seldom wears stockings, but her shoes are high-heeled importations of colored leather, often ornamented with red and yellow kid butterflies. All other splendor paled, however, as I gazed at those marvelous skirts displayed to great advantage on the hilly streets of the city.

In utter contrast to the merry faced Cholas, so sumptuously bedecked, were the aristocratic señoritas bound churchward, wearing black garments and a devout expression. They passed under our balcony in the morning, their sweet, pale faces half hidden by the *mantos* draped about their heads; but in the late afternoon, when there was music again in the plaza, they blossomed out in Parisian gowns and beflowered hats. As they walked around the square, well chaperoned, the youth of the city paid tribute to their beauty.

In the Latin-American countries, where the freedom of acquaintance existing in America between men and women is unknown, the early stage of courtship is the language of the eyes. It is perhaps as well that the lover first woos his lady fair with tender glances. Were he obliged to call on her often, conversing

A CHOLO BOY OF LA PAZ

at length in the drawing room, his devotion might wane, for there is no method employed of heating rooms artificially; no furnaces, stoves, or fireplaces in any of the native houses. For culinary purposes braziers are employed, charcoal and the *taqui* of the llama being used as fuel. A compassionate American, forever enshrined in my memory, loaned us a coal-oil stove just imported from the States, and our first evening in the city, and all that followed, were spent in close proximity to this beloved heater.

We found the little fur shops an attractive feature of the town. Tawny vicuña and silvery chinchilla skins adorned the walls. The chinchilla is becoming scarce and its coarser relative, the viscacha, is sometimes sold to unwary customers as a substitute. Like all animals whose skins have a high market value, the chinchilla has been killed in and out of season and is destined to extinction. The ruddy, silky fur of the vicuña has few rivals in beauty and was greatly valued by the Incas. In their day this wild cousin of the llama, of the original cameloid stock, was hunted in the Andean highlands even more extensively than it is today.

If La Paz is a peacock, the market place is its tail. Here the maids of the iridescent skirts hold court. The stalls occupy an entire square under cover, the overflow lining both sides of the street for blocks. I felt that I was attending a fancy dress ball and looked about for masks. Color ran riot. Seated on the ground, encircled in petticoats ranging in shade from scarlet, rose, and pink to purple, violet, and lavender, the Chola merchants displayed their wares spread

TYPES IN LA PAZ

out before them on colored blankets. Nothing was sold by weight. The produce or merchandise was arranged in the primitive way, in little heaps, on which a price was set. The people bought their supplies only for the one day. I followed a modest purchaser, who filled his basket with two cents' worth of *chuño* (the frozen potato, on its native heath), three cents' worth of *charque* (jerked beef), and four whole cents' worth of fruit.

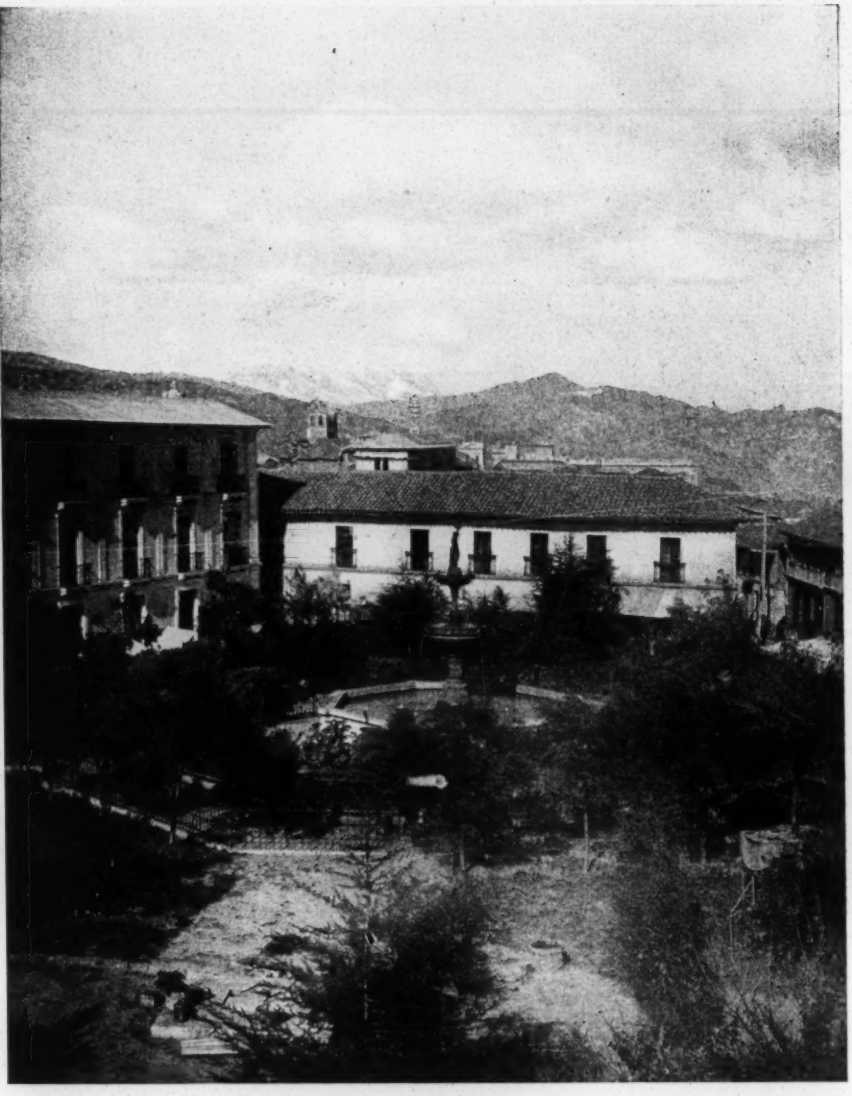
Although La Paz is situated upon the roof, its market is filled with every variety of fruit, vegetables, and flowers from the gardens of the Yungas, on the eastern slope of the Andes. Llamas and burros bring the produce to town, and on Sunday morning the country people may be seen coming on foot down the steep trails from the heights, urging on their tired animals. Their goal is the Sunday market, the eventful day of the week.

I went from one stall to another, learning much of the ways and needs of the people. A native café interested me. The chef, a little Cholo boy, squatted on the ground beside a brazier, watching a pot containing the favorite *chupe*, grandmother to the Irish stew. When the feast was ready there was a general scramble, fingers serving in place of spoons.

An Indian artist, hawking his wares, next claimed my attention. He sold his work by the yard, colored figures on a white background, and I have ever since been endeavoring to unravel his pictured story. It seems to be the portrayal of some oral tradition handed down from his forefathers.

From the artist I turned to a musician, a "Pan-come-true" playing on reed pipes. I wondered how this shepherd had managed to slip away from his flock of alpacas up on the cheerless mountain, and realized that this was a great day for him, a mad whirl of social pleasure. A saucy-faced little flower-seller seemed to be the princess of his dreams, for he piped his sweetest as he passed her booth.

The shepherd was not the only musi-



A PLAZA IN LA PAZ, SHOWING MOUNT ILLIMANI IN THE DISTANCE

cian in evidence, however. Along came a rival thumping on a guitar-like instrument constructed from the shell of the armadillo. This gallant held my attention only for a moment, for my notice was called to a solemn-faced little youngster, who evidently had an elastic stomach. He was stowing away enormous quantities of sugar-cane, while his big sister stood lost in admiration of a Chola merchant wearing a pea-green blouse, at least fifteen petticoats, and a pair of earrings three inches in length. The country damsel wore only one scant skirt and a ragged shawl, and her face, as she gazed on the dazzling Chola, expressed both envy and awe.

It was most interesting to me to see the Quichua and Aymará types side by side. They seldom blend in their native

TYPICAL INDIANS OF BOLIVIA

ON THE ROAD TO LA PAZ

highlands. The pure-blooded Indian fears and dislikes all whites and is not on intimate terms with the Cholos. He often understands Spanish, even when he can or will not speak it. On the highway he appears very respectful, greeting the stranger with a gutteral "Tata, asqui ura churutam" (Father, a good day to thee).

The shoe stall proved the market's "star" exhibit. Every possible combination of color was displayed in the footgear. On the street I saw men and women carefully carrying their shoes, saving them for the following "fiesta" day, when they squeezed their poor rock-worn feet into the gorgeous yellow creations decorated with pink, blue, and purple designs. After paying for any purchase the customer expects some little thing to boot from the merchant.

As we walked away from the market we came on a group of children playing a favorite game, which was not "hide and seek," but a mock bull fight. One child had horns tied on his head, and the other boys represented *torcadors*. Bright little fellows, these future Bolivian citizens. A day of progress has dawned for them. La Paz is now connected by rail with Chilian, as well as Peruvian, ports, and before long Bolivia will be traversed by a railroad connecting Peru and Chile with northern Argentina. In time the road will also be finished from La Paz to Puerto Pando, at the head of navigation on the Beni branch of the Madeira River, and the line constructed around the dreaded Madeira Falls, on the route to the Amazon.

There were few foreigners in the city at the time of our visit, but the number is increasing steadily, with the arrival of American engineers, German merchants, and British capitalists. The Bolivians of

PET FIGHTING COCK OF THE FAMILY: NEAR LA PAZ

the better class have long been people of charm and culture. Even in the days when every luxury was brought up from the sea on the backs of animals, requiring a journey of months' duration, the homes of refinement were filled with European treasures and the educated people kept in touch with the outside world.

We visited all of the modern municipal buildings, and I was so selfish as to regret them. I dread the time when La Paz will lose her captivating individuality.

Through the city flows the Chuquiapu River, spanned by many bridges. It is a remarkable stream, inasmuch that it does not flow to the Pacific, as do most rivers formed on the western slope of the Andes. The Chuquiapu defies the natural order and flows through a cleft in the mountains, joining the streams bound for the Amazon.

One day we mounted mules and followed the merry little river. Our way led through steep, narrow streets to the Alameda, the city's park. By way of an avenue lined with stately trees we entered the suburbs and were soon out of sight of the town. The road now clung to the cliff and the canyon developed into a miniature Yellowstone in coloring. With each mile the mountain walls grew more rugged, more picturesque in their rainbow attire, and we very reluctantly turned townward. As we entered the city I looked back as the sunset glow enveloped the snow-clad Illimani, the mountain known to the Aymarás as "The Everlasting," guardian of the picturesque canyon of La Paz.

Although the Bolivian seat of government has never been moved officially from the city of Sucre, La Paz is in reality the capital. Far easier of access than the interior city, it is now the home

YOUTHFUL PONGOS ON THEIR FIRST VISIT TO TOWN
(SEE PAGE 124)

A CHOLA GIRL: LA PAZ

of the President and his Cabinet and the headquarters of the army. Before the Europeans came the city was known as Chuquiapu, which means "the place of gold" in the Aymará tongue, and upon the site of the ancient town "Nuestra Señora de La Paz" (Our Lady of the Peace) was founded by the Spaniards in 1545. After the final victory of independence, in 1824, the name was changed to "La Paz de Ayacucho" (the Peace of Ayacucho) in honor of the famous battle-ground.

There is a deep significance in this application of the name of Ayacucho, reverenced by all South Americans as the place where the Spaniards met their Waterloo, for La Paz can now claim both Alpha and Omega. It was in "Nuestra Señora de La Paz," in the year 1809, that the first cry for liberty was sounded in the Southern republics.

CHOLA GIRL IN PARK: LA PAZ

Remote from the seat of Spanish authority, the spirit of independence had been fostered in this country, then known as Alto, or Upper, Peru. Here the people had suffered most from the cruel *mita* and many other forms of tyranny. The first proclaimed Declaration of Independence ran: "In the noble and valorous city of Our Lady of the Peace, at 8 o'clock at night, on this 16th of July, 1809, assembled in the salon of the Cabildo, the undersigned, in the name of the people, declare and swear to defend with their blood and fortune the independence of the country."

It was in the Plaza Murillo, opposite our windows, that one of the great signers of this declaration was led to the scaffold the following year. Yet in the prophecy uttered in his farewell, "The torch which I have lighted shall never be extinguished," Pedro Domingo Murillo voiced a great truth. Recalling the twenty flags of the Latin-American republics, one realizes that he and his fellow-patriots did not die in vain.

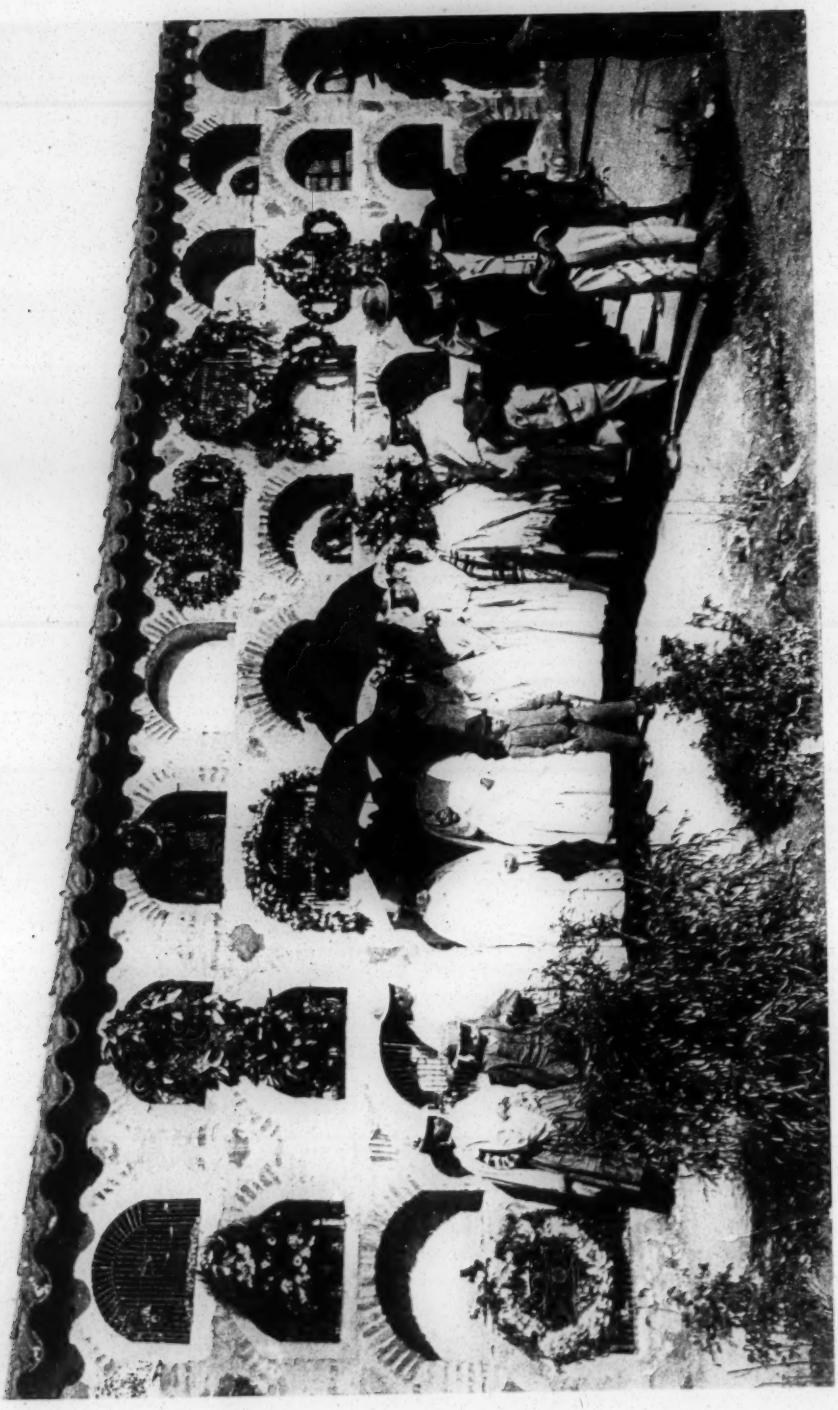
To the traveler the interest and charm of a city like La Paz lies not only in its ever-changing scenes, for every street, every other building, has its history. I never entered the old court-yard of our hotel at twilight without picturing scenes quite as attractive and far richer than those of today. From the balconies above I seemed to see fair, bejeweled ladies, robed in satin brocade, with great tortoise-shell combs crowning their heads, looking down, as mounted cavaliers rode gaily into the patio, resplendent in armor, silver trappings on saddle and bridle. Those were indeed picturesque days, under the vice-royalty; and sometimes, in the very early morning, when the city was still asleep, I walked up the old highway leading to the heights. Failing to look back at the tiled roofs, I quite

GOING TO MARKET: LA PAZ

forgot the coming of the Spaniards, for the men and women whom I met on the road belonged to a time long past. Speaking a tongue even more ancient than the Quichua of the Incas, these people were little changed from their ancestors who lived in Aymará-land. In those olden days, when the habitation in the canyon was known as Chuquiapu, just such wayfarers as these urged their llamas down the steep hill at dawn, hoping to be the first of the country folk to reach the village market.

Too soon came the day for our departure. Regretfully we rode up to the Alto, where we stood for a time bidding "farewell" to the canyon. Yet I find I have never lost sight of it.

Up here in our progressive America, where we rush and strive from morning till night, where all of the cities are alike, and every man, woman, and child dresses like every other, I think happily of "Our Lady of the Peace." When the day is especially colorless I recall with delight that far-off canyon, where lies the quaint city of "high lights," kaleidoscopic La Paz.



CEMETERY IN LA PAZ

The Cholo women in white are the mourners. Tombs are decorated with artificial wreaths of wax or porcelain

MONTE BLANCO, OVERLOOKING LA PAZ

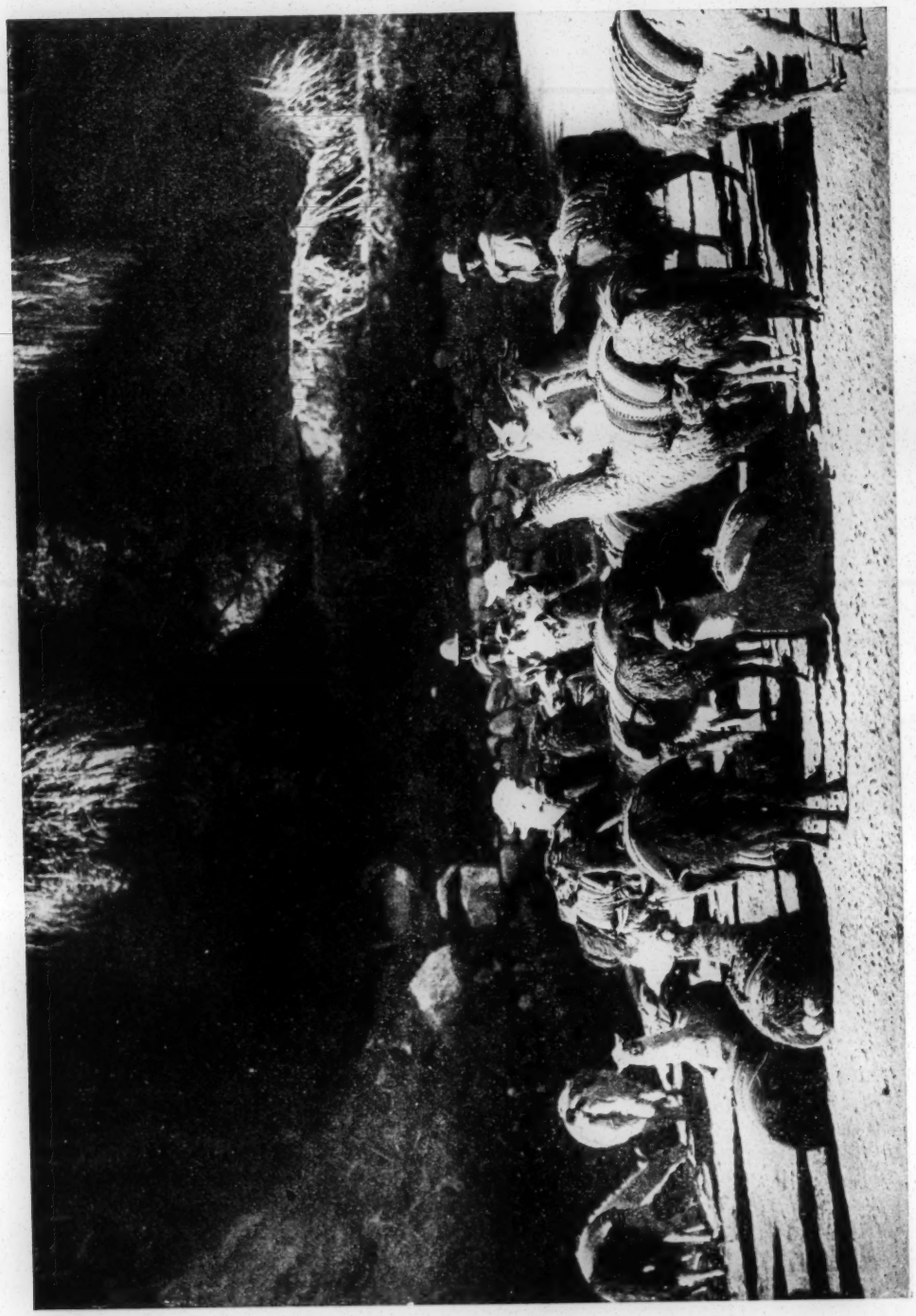
PLAZA SAN SEBASTIAN: LA PAZ

A HOLIDAY CROWD IN THE PLAZA SAN PEDRO: LA PAZ

MARKET SCENE: LA PAZ

La Paz is over 12,000 feet above the sea, but its market is filled with tropical fruits from the forest country on the eastern slope of the Andes

STREET SCENE: LA PAZ



LLAMAS: LA PAZ

THE MOUNTAINEERS OF THE EUPHRATES*

By Ellsworth Huntington

THREE thousand years ago the proud kings of Assyria led their trained armies northwestward into the mountainous region of the upper Euphrates and Tigris rivers. The turbulent mountaineers against whom they advanced fled before the civilized soldiers of the Mesopotamian plain and took refuge in inaccessible heights, leaving their rude villages of mud and stones to be destroyed.

Invariably the kings claimed to have defeated the wild upland tribes, as boastful inscriptions carved in the living rock still prove; but the defeat was never permanent. As soon as the soldiers retired the mountaineers reoccupied their villages, and soon began to plunder the lowlands as lawlessly as ever.

Centuries later, when Xenophon led his ten thousand Greeks from the lower Euphrates northward across the Armenian plateau to Trebizond, the mountaineers were still untamed. All night they rolled stones down the mountain-side upon Xenophon's army, and were only vanquished by a stratagem.

Today the great empires of Mesopotamia have fallen; the power of Greece has passed away; but still, as of old, the mountains breed lawlessness, and the mountaineers are the unsubdued scourge of the people of the plains.

The lineal descendants of the Carduchi who opposed the march of Xenophon are the Kurds—a sturdy, strong-featured race of Mohammedan Aryans, allied to the Persians on the one hand and to the Armenians on the other. Their home is in the southern part of the Armenian plateau, among the headwaters of the Euphrates and Tigris rivers, and in the Zagros Mountains, which run southeastward from Lake Van to the Persian Gulf and form the boundary between Turkey and Persia. There they tend their flocks; for the majority are primarily shepherds, although they cultivate the soil so far as possible.

Although most of the Kurds possess villages, composed of clusters of low, flat-roofed houses of stone or mud, all the tribes are more or less nomadic. The majority live in dark-brown, many-peaked tents of goats' hair during the summer, not wandering far from home, but merely going up into the high mountains, where it is too cold and snowy to dwell in winter.

A considerable number, however, live a purely nomadic life, wandering hundreds of miles along regular routes between the warm plains of Mesopotamia in winter and the cool, grassy uplands in summer. Among the pure nomads society is organized upon a half-tribal, half-patriarchal system, while the semi-nomadic Kurds are either divided into tribes or clans, like those of medieval Scotland, or are ruled by feudal lords, whose power is often absolute.

Poverty is the rule among the Kurds; their mountain fastnesses are difficult of access, and they themselves are strong and hardy by reason of their life of exertion. The people of the neighboring fertile lowlands, on the other hand, are relatively well-to-do, and are also comparatively unprotected and averse to war. All these factors combine to make the Kurds a race of plunderers. "No race," says the famous geographer Reclus, "neither Baluch, Bedouin, nor Apache, has developed the marauding instinct to a higher degree than have the warlike Kurd tribes."

One of the places where they are most lawless is Dersim, a highly mountainous district lying between the two main branches of the Euphrates River. For scores of years the Turkish authorities, like their ancient Assyrian predecessors, have been vainly trying to bring the Kuzzilbash Kurds of this region into subjection. Last summer a new opportunity seemed to offer itself. The rainfall of the winter of 1907-08 was unpropitious, and the Kurds succeeded in raising

* This is the first of several articles by Mr Huntington describing little known regions of Asia which will be published in the National Geographic Magazine during 1909.

only very scanty crops from their stony mountain-sides and narrow valley bottoms. It was necessary to procure food from more prosperous places. A few began to plunder their neighbors; the majority attempted to buy food in a legitimate way.

The government heard that a large caravan loaded with grain which the Kurds had purchased was on the way to Dersim. "Now," said the officials, "is our chance to deal the Kurds a telling blow without danger to ourselves." Troops were ordered to seize the caravan. When the Kurds heard that the grain on which their wives and children must rely for sustenance was lost to them, there was a fierce uprising on all sides. The government ordered troops into the mountains, but at first the soldiers would not go. They were only half paid and half clothed. Why should they risk their lives in a wild region, where the enemy hid behind rocks high on the mountain-sides and never gave the invaders a chance to shoot them. Ultimately some 30,000 troops are said to have been sent to the confines of Dersim. There was more or less fighting, a number of men were killed on both sides, and some of the Kurdish leaders were imprisoned.

The Kurds have been punished, but not conquered: they will probably remain quiet only until they become hungry once more. Like those other scourges of Turkey, the Albanians in the Balkans and the Arabs in the Syrian desert, they cannot be made to keep the peace permanently unless some economic change can be introduced to prevent them from suffering when their parched hillsides fail to furnish an adequate supply of food.

The southern part of the Armenian plateau, where many of the most warlike Kurds dwell, furnishes an admirable example of the influence exerted upon man by inhospitable mountains among which lie fertile plains. The plateau is highly diversified. Above its uneven surface rise lofty ranges of limestone mountains and scores of great volcanoes, such as Nimrud and Sipan, near Lake Van, so recently extinct that hot springs still abound in the craters and elsewhere. Below the general level of the plateau magnificent canyons have been cut by the Euphrates and Tigris rivers and their tributaries, while broad basin-shaped depressions are floored with smooth, fertile plains.

Originally the whole country was probably occupied by the Carduchi, the ancestors of the Kurds. Over two thousand years ago, however, the Kurds gave way before Armenian conquerors, who, in turn, submitted to Turkish invaders in more recent times. The result of these invasions, on the one hand, and of the diverse topography of the country on the other, is seen today in the distribution and character of the three races—Kurds, Armenians, and Turks—who now occupy the region of the upper Euphrates. The Kurds, being the conquered race, hold the mountains and some of the less accessible valleys and basins. Like many races which have been driven to the highlands by strong invaders, they are now the terror of their conquerors.

The Armenians occupy a position intermediate between the Kurds and the Turks. Sometimes they live in the heart of the mountains and are of a decidedly warlike character. Often they occupy somewhat secluded basins or valleys, girt by lofty hills, and in many cases they possess large portions of the most fertile plains. The Turks, as befits the most recent conquerors, are generally confined to the richest plains and to the cities. The areas occupied by the three races are not marked off distinctly. In some cases Kurds, Turks, and Armenians all live close together. In the cities each race often has its own quarter; but it is very rare to find all three in the same village. Armenians and Turks, however, often occupy different quarters of a single village. Nevertheless, on the whole, the three races live apart, each having its distinct habitat.

The Kurds, Armenians, and Turks have little love for one another. The Kurd hates the Turks because they have often worsted him in battle, because they tax him heavily whenever they are able,

and because they curtail his opportunities for fighting and plundering. He despises the Armenians because they are Christians, and because they can be robbed and ill-treated almost with impunity when the Turks give permission. Yet in spite of this he has a sort of sympathy for them, because they, too, are oppressed.

The Armenian hates and fears both the Kurds, who plunder him, and the Turks, who oppress and persecute him. He also despises both races because they are not so clever as he. It is only by exerting his superior wits in business or in flattery of his rulers that he can manage to maintain his position. It is not strange that his character reflects the conditions under which he lives.

The Turk, in turn, despises the Kurds because many of them are very half-hearted or heretical Mohammedans, and because they are simple, unsophisticated folk. He fears them, also, because they are wild, lawless people, who make the life of the tax-gatherer a burden and who rob a Turkish official with great glee if they find the opportunity. The Turk despises the Armenians because, as he would somewhat unfairly put it, "they are cowardly Christian dogs." He hates them because he knows that they are far quicker and keener than he, far better business men, and far better educated.

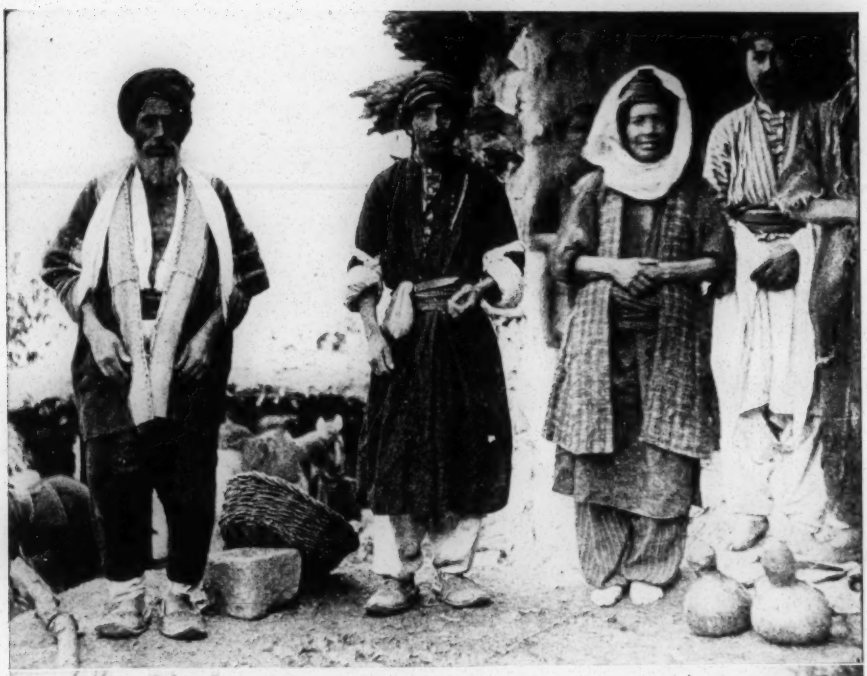
The Turks realize their own mental and industrial inferiority to the subject race, and they realize, too, that the Armenians owe much of their present advancement in education and industry to American missionaries. The common feeling among the Turks prior to the recent revolutionary crisis is well illustrated by a saying which was common among them two or three years after the sad massacres which were perpetrated upon the Armenians in 1894-96 by the Kurds, with the consent of the Turks. "A few years ago," said the Turks, "these Christian infidels were stripped of everything. Now," as the Turkish idiom puts it, "they eat better than we do. What shall we do about it?"

Racially the Turk in the upper Euphrates region has little reason to despise either the Kurds or the Armenians. Two out of three of his ancestors probably belonged to one race or the other. Not only are Kurdish and Armenian women frequently taken to Turkish harems by force or otherwise, but there is a constant process of assimilation going on. When a Kurd comes from the mountains to work in the city or in a large village, he forms the habit of speaking Turkish instead of his own semi-Persian tongue. Little by little he gives up Kurdish ways of thought and action and passes himself off as a Turk, especially if he begins to rise in the social scale. All over the country villages can be found which are properly Kurdish, but are situated among Turkish villages and are gradually becoming assimilated to their neighbors. Other villages can be found which are now considered Turkish, but which have distinct traditions of a time when all their inhabitants were Christian Armenians. They were converted by force during some period of persecution and now intermarry with the true Turks, and are zealous Mohammedans.

A good example of the transition from Armenians to "Turks" is found in the small mountain-girt basin of Bermaz, south of the city of Harput. The villagers are known as Kurds at home, but as Turks when they go abroad. According to reliable Armenian sheep dealers who have most intimate dealings with them, the people of Bermaz make the sign of the cross before meals and have a common tradition that their ancestors were Armenian Christians a few centuries ago.

Religious edifices of any kind are rare in these villages, although prayers are said according to the common Mohammedan practice. Apparently the process of becoming "Turks" is only half completed. In a few hundred years more such villages will probably claim to be purely Turkish.

The mixture of religious ideas among the more remote inhabitants of the upper Euphrates region is singular. Dersim, the region already referred to, between the two main branches of the Euphrates,



Photos by Ellsworth Huntington

AN ARMENIAN FAMILY, CONSISTING OF A FATHER, SON, MOTHER, AND SERVANT, IN ORDER FROM LEFT TO RIGHT

The long sleeves of the undergarment are arranged in four different ways. In winter they are used in place of gloves. The stone pestle and the gourds for water are common in remote districts.

A GROUP OF ARMENIANS READY FOR DINNER

Their costume displays the extent to which they have been influenced by the west. Some wear tunics, others are clad in baggy Turkish trousers, and one has adopted tight European trousers, and therefore finds it inconvenient to sit on his knees or cross-legged as the others do.

Photo by Ellsworth Huntington

A PORTION OF THE CITY OF HARPUT

It lies around a strong castle 1,500 to 2,000 feet above one of the broad, fertile basin-plains of Armenia. The large roofless building on the right is an Armenian church, which was burned by the Kurds during the massacres of 1905.

is inhabited largely by Kuzzilbash Kurds who are neither good Mohammedans, good Christians, nor good pagans. Nominally they belong to the Shiah sect of Mohammedans, who are looked upon with great aversion by oxthodox Sunni Mohammedans, such as the Turks. In practice the Kuzzilbash are very cosmopolitan in their religious observances. When away from home they readily join in the prayers at either a Shiah or a Sunni mosque. If they happen to be in an Armenian village where there are no Turks, they often go in and join in the Christian service, kneeling and bowing with the congregation. At home they are said not to pray except when led by one of their sayids, or holy men, who are supposed to be descendants of Mohammed. As a matter of fact they, like the rest of the Kuzzilbash, are probably descended, in part at least, from Armenians whose conversion to Mohammedanism was not exactly a matter of conviction.

One of the most peculiar customs of the Kuzzilbash is an ancient rite which is apparently of Christian origin. No European has seen it, but, according to trustworthy Armenians, the Kuzzilbash men gather at the mosques on solemn feast days and one by one they advance to the front of the sacred building—on their knees, it is said by some. As each man comes forward a sayid takes a bit of meat, dips it in wine, and puts it in the man's mouth. Such a ceremony can scarcely be anything but a relic of Christianity.

In many places Turks, Kurds, and Armenians all reverence the same shrines—places which have probably been sacred since the far-off days of the pagans who fought with the Assyrians or opposed the march of Xenophon. One of the most notable of such places is located in Mushar Dagh, or Mushar Mountain, inside the point of a sharp bend to the westward made by the Euphrates River

Photo by Ellsworth Huntington

AN ISLAND CASTLE IN THE EUPHRATES RIVER NEAR THE MOUTH OF THE CANYON

The stairways, platforms, and tunnels on this rock and on the fortified cliffs on either side of the river were carved by the Haldis, one of the old races of mountaineers who fought with the Assyrians. The fortifications must have been constructed to guard against enemies coming down the river, probably on rafts of skins such as are represented upon Assyrian monuments and are still in use.

around the Harput Mountains near Malatia.

Close to the river lies a great rock, fashioned by an ancient race called Haldis into a castle whose main feature was innumerable platforms, steps, cisterns, and tunnels carved in the solid limestone. Four hundred feet up the bare brown side of the mountains a rude platform of mud and stones is said to be the grave of a saintly Armenian girl who cared for a ruined church which lies two thousand feet higher, at the very peak of the mountain. Beside the grave stands a scraggly thorn-bush decked with a multitude of fluttering rags of every hue.

As the writer stopped beside it his Armenian guide lifted the cotton robe which hung half way to his ankles, and from the bottom tore a strip of cloth. This he tied to the bush. "What is that for?" I asked. "Are you sick?" "No," was the answer, "I am not sick, but I may have a pain some day, and this will drive it away." He went on to explain that the grave was extremely holy, and that the sainted girl had great power to heal diseases. The Kurds of the neighboring village evidently are of the same opinion, for they tie rags to the bush, and their chiefs are brought here for burial, altho the common people must be content with a final resting-place down by the river.

Five or six hundred feet above the resting-place of the Armenian girl, a limestone cave contains a grave reputed to be that of a Mohammedan saint called Hassan. The supposed grave is of enormous size, and is covered by a great mass of dry clay adorned with velvet and tinsel brought by pious worshipers. The back of the cave is partially walled off from the

Photo by Ellsworth Huntington

ARMENIANS CONSTRUCTING A RAFT OF INFLATED SHEEPSKINS ON THE BANKS OF THE EUPHRATES RIVER

The partially finished raft has been lifted up in order to show its construction. The woman on the right is carrying drinking water from the river. She scoops it up with the gourd in her right hand

Photo by Ellsworth Huntington

A COMPLETED RAFT OF INFLATED SHEEPSKINS

portion which contains the grave, and there, in a recess, all manner of filthiness is gathered—the bones, sinews, and gristle of sacrifices which pilgrims have devoured beside the grave. Outside the cave the place of sacrifice appears—a great altar, four-square, of rough stones, covered with the dark gore of countless victims offered through the ages by Turks, Kurds, and Armenians, all of whom hold the spot in equal reverence. Beside the main altar stands a smaller one piled high with the horns of sacrifices. Great beams have been put up between this altar and a neighboring rock, and from them hang large copper caldrons, donated by pilgrims for the use of the offerers of sacrifices. No man dare touch the sacred objects except for their legitimate uses, and the caldrons and the offerings of tinsel and cloth within the cave remain unmolested in a region where all things else are constantly subject to theft.

The crowning holy place in this bend of the Euphrates is the ruined church of Mushar Killisseh, or Surp Aharon (Saint Aaron), as the Armenians call it, on the top of the mountain, 2400 feet above the river. The men who built it must have had great love of scenery or else a great desire for safety or seclusion. Otherwise the church would scarcely have been built in so inaccessible a spot, unless, perchance, the site was originally chosen as a holy place by worshipers of the sun. The chief interest of the shrines of Mushar Dagh lies in the fact that they indicate how closely the various and apparently diverse races of the upper Euphrates region are actually united to one another. In spite of conquest and racial difference, in spite of the diversity of life occasioned by the contrast between the fertile plains and the barren mountains, all races still reverence the shrines of their remote predecessors.

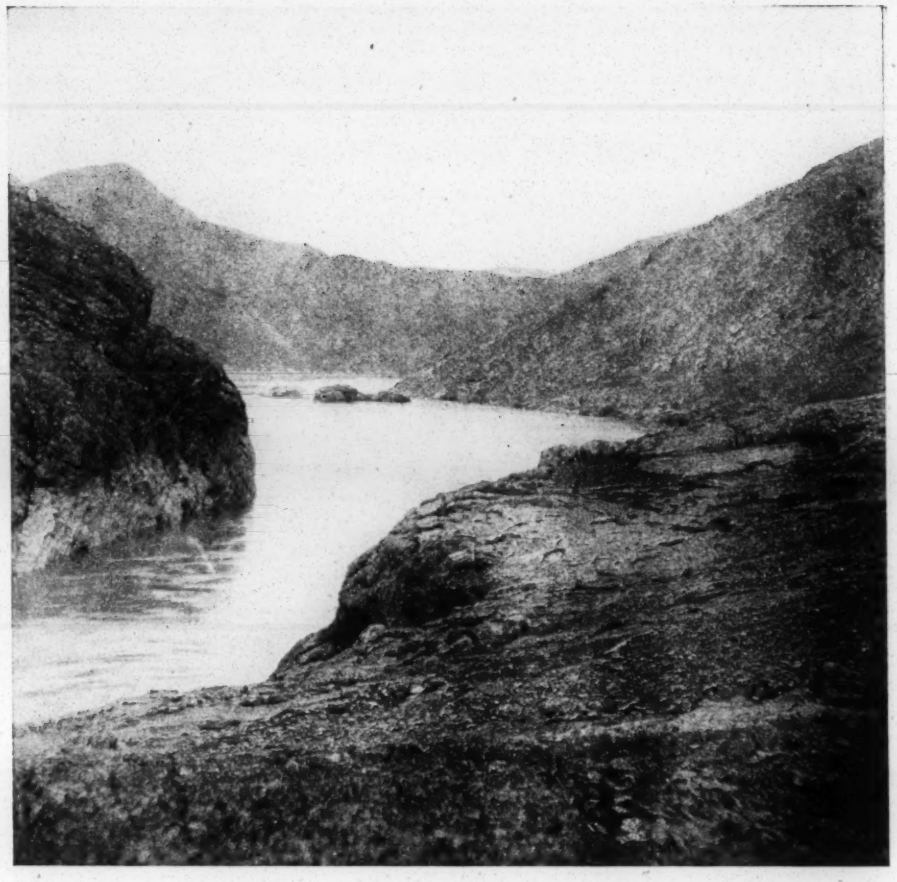


Photo by Ellsworth Huntington

MARBLE GORGE OF THE EUPHRATES NEAR KEBAN MAADEN

In ancient times marble was quarried on the right of the river and was apparently floated down stream on rafts

The customs, manner of life, and mode of thought of the Turks and Armenians are fairly well known; but those of the Kurds have been studied comparatively little. A few examples will give an idea of certain of the most noteworthy Kurdish characteristics. In the spring of 1901 the writer, in company with Professor Thomas H. Norton, U. S. Consul at Harput, was able to make a trip of two hundred miles down the Euphrates River through the great series of canyons by which the river traverses the Taurus Mountains. Only once before had the journey been made—by the great German general, Von Moltke, in 1838.

The raft was made of sheep skins, taken off entire and inflated with air. Thirty such skins, like great bladders, were tied under a frame of poles, and made a wonderfully buoyant raft. Rapids abound and our Armenian raftsmen feared to shoot them. Accordingly, at first we made arduous portages around rapid after rapid, climbing far up the steep walls of the canyon and descending over the rockiest of trails.

At length the canyon became so narrow that it was impossible longer to scale the sides, and we were obliged to shoot rapids much larger than those around which we had wearily climbed. Time

Photo by Ellsworth Huntington

ENTRANCE TO THE MAIN GORGE OF THE EUPHRATES

after time we were drenched in great waves which broke over us at the foot of smooth-sloping sheets of water, where the raft seemed to drop like a toboggan. Once one of the men was washed overboard by a wave, but was caught by his companion, who seized the skirt of his gown as he disappeared. Once the raft struck upon rocks in the midst of a wild rapid, but fortunately it held together and we came through safely.

On this journey down the Euphrates, our first contact with the Kurds was at a ferry. As we glided toward the ferry the Armenian raftsmen said: "Do you see that boat? It belongs to the village next above ours. Last winter the old boat belonging to the Kurds was carried away in a flood. As soon as the water fell they came up to our neighbors' village and carried off their boat. And what could the poor Armenians do? They have no guns. The Turks have taken them all away."

As we floated toward the Kurds we approached the shore, and finally stopped close to them. "Backsheesh! Backsheesh! A present," was their greeting. "This is our ferry, and you must pay us." It made no difference to them that, as we pointed out, we were using our own conveyance, and were going down the river,

Photo by Ellsworth Huntington

TURKISH SOLDIERS CROSSING THE MUZUR SU, A BRANCH OF THE EUPHRATES RIVER, BY MEANS OF A SMALL RAFT OF SKINS, TOWED BY A FRIGHTENED HORSE

not across it. They took out their long flint-lock guns and prepared to shoot. It was only when we emphasized the fact that our party contained a consul that they let us go without payment and without gunshot.

Later we came to an isolated crag of naked rock rising close to the river and crowned by the ruins of an ancient castle, used first by the Haldis, then by the Romans, and finally by the Saracens. At its foot lay the ruined mosques of Pertag, a town which was moved to another location nearly a hundred years ago because soldiers were quartered on the inhabitants for half a year at a time.

Some months later I visited the new town—a picturesque place at the foot of hot, white, limestone mountains, from which gush out springs of clear, cold water to support the trees and vines that embower the flat-roofed adobe houses. As my companion and I were sitting under the ever-present mulberry trees, enjoying a watermelon with yellow flesh and brown seeds, a ragged man, hot, breathless, and exhausted, came running up to the house where twenty soldiers were quartered to preserve the peace. At once there arose the sound of shouting; horses were led out; soldiers were seen taking down their guns and ammunition; the villagers came out of their houses or in from the fields in wild excitement, loading their long guns as they walked. Some of the soldiers and villagers went in one direction, some in the other. It appeared that three or four hundred sheep and goats belonging to the village had been grazing, an hour's journey away, when a band of Kuzzilbash Kurds swooped down upon them. One shepherd was shot; the others ran away. Now the whole village was going out in an attempt to overtake and punish the robbers. How it turned out I do not know,

Photo by Ellsworth Huntington

A KURD SWIMMING ACROSS THE EUPHRATES ON AN INFLATED GOATSKIN

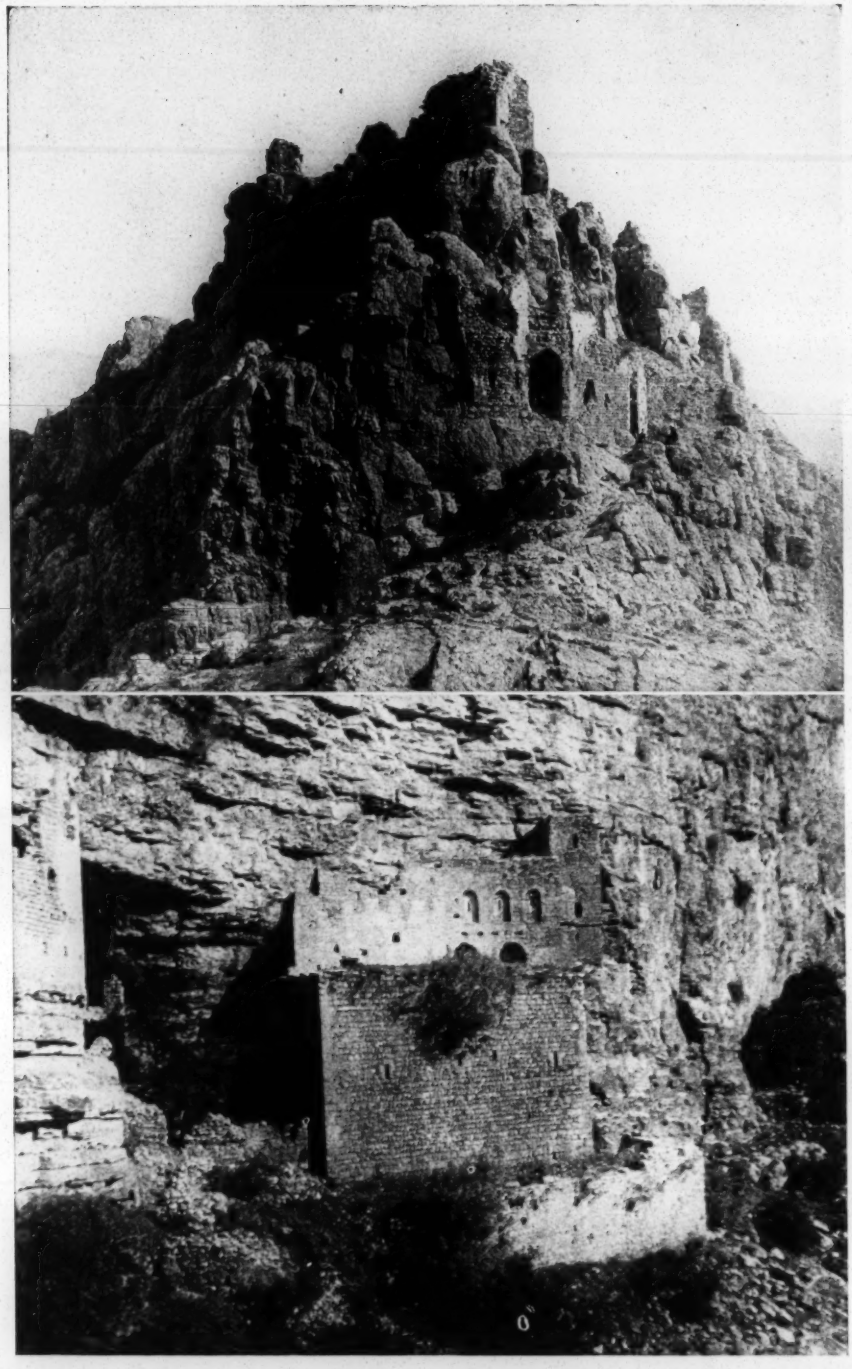
for we were obliged to continue our journey. The government was so afraid that some harm would befall the foreigners of our party that it insisted upon increasing our escort for the next few days to four, then seven, and finally sixteen soldiers.

After spending seven days in voyaging down the Euphrates we landed at the picturesque castle of Gerger, on a peak among the foothills which overlook the great plains of Mesopotamia. There we stayed a few days in a village occupied partly by Kurds and partly by Armenians.

One day I went out to copy a long Greek inscription dating from about the time of Christ. Some twenty swarthy Kurds in white cotton drawers, white shirts, and gaily embroidered waistcoats followed me. As I copied the old Greek words, they leaned on their long guns and talked in low tones, until at length they seemed to come to some decision, whereupon they all went quietly away. Then I heard the sound of gunshot after gunshot, coming apparently from the gate of the castle.

When I went out, the graceful Arabic inscription over the door was seen to have been freshly chipped and defaced. Evidently the Kurds had been firing at it. Back at the village the servants explained the matter as they had heard it from the Kurds. The Kurds, it appears, believe that all inscriptions tell where gold is buried. As they watched the foreigner copy the Greek inscription they said to one another: "We can't stop him now; he has copied this one and will find the gold. Let's go outside and spoil the inscription over the door, so that he shan't find that gold, too."

That night I made minute inquiries



Photos by Ellsworth Huntington

THE CASTLE OF GERGER, OCCUPIED SUCCESSIVELY BY HITTITES, ROMANS, AND SARACENS

The size may be judged from the figure in the doorway

SYRIAN MONASTERY PLASTERED AGAINST THE WALL OF THE CANYON OF THE EUPHRATES RIVER

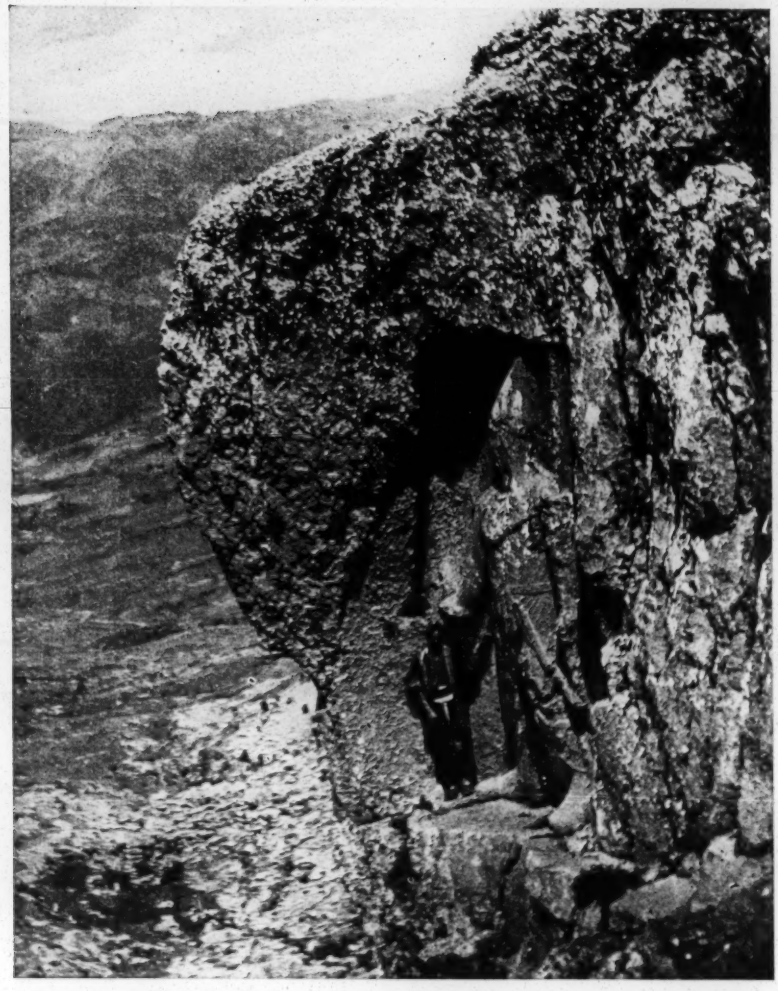


Photo by Ellsworth Huntington

HITTITE FIGURE CARVED IN SOLID LIMESTONE AT GERGER CASTLE

concerning a square cave which had been excavated thousands of years ago in the face of a perpendicular cliff of limestone on one side of the castle. Were there any inscriptions in it, or any rock carvings? The natives did not know. The next day I went down the river a few miles to an old Syrian monastery, plastered like a swallow's nest against the middle of the wall of the Euphrates canyon, here only some four hundred feet deep, but very narrow. In the wall of the monastery was a Syriac inscription upon a large stone imbedded in the wall about six feet below the roof. The only way to copy it was to let oneself down by a rope over the side of the building. As I sat in a bight of rope, dangling in space, the guides on the roof cried out, "Look, look, down there in the river." I looked, and there, far down below us in the yellow, muddy water, was the body of a man floating rapidly along. When I was pulled back to the roof, I inquired what sort of man he was. The guides only shrugged their

shoulders and said: "I suppose the Kurds up the river killed him and threw him in. Perhaps they robbed him. They often do that sort of thing."

In the village that night the servants remarked: "Do you know what the Kurds did while you were gone? They said, 'The foreigner can't fool us. He asked about that cave because he had read in the inscription that the treasure is buried there.' So they got a rope and let one of their number down. He pawed around in the dirt and at last was pulled up, and said that there was nothing there. 'You're a liar,' said the others. A second man was let down and brought the same report. A third had to be let down before the Kurds believed that there was no money in the cave."

The Kurds are full of strange ideas as to ruins. One day the conversation touched upon the hardness of the mortar in a certain ancient wall. "Do you know why it's so hard?" said one. "I'll tell you. This castle was built by a great king, who had an enormous flock of hens. When he was building the castle he had a huge trough built. Every night he gathered the eggs from twenty thousand hens and put them in the trough. The next day his men broke up the eggs and used them to make mortar. That's why the walls are so strong."

Credulous, fierce, and untractable as the Kurds are, they are nevertheless a people of true strength of character. Today they are a menace to the development of constitutional government in Turkey. They themselves are ruled partly by the patriarchal system, partly by the clan system, and partly by the feudal system, and all have had bitter experience of the hated rule of a despotic monarchy. Now they are suddenly given an opportunity to live under constitutional government. Little they care for that; but if they once understood it they would probably be among its staunchest supporters. For three thousand years they have lived the same wild, simple life, remote from all men and at strife with all men. Now, by no act of their own, modern ideas are coming to them. It is hard to foretell whether the recent changes in the government of Turkey will have any effect upon them, or whether they will continue to be influenced only by the mountains and the hard conditions of their immediate environment.

ONE THOUSAND MILES OF RAILWAY BUILT FOR PILGRIMS AND NOT FOR DIVIDENDS*

By Colonel F. R. Maunsell

THE Damascus to Mecca Railway has many remarkable features which distinguish it from other lines. Its principal object is to provide a means for faithful Moslems to perform their pilgrimage to the holy places of Mecca and Medina with a greater degree of comfort than formerly.†

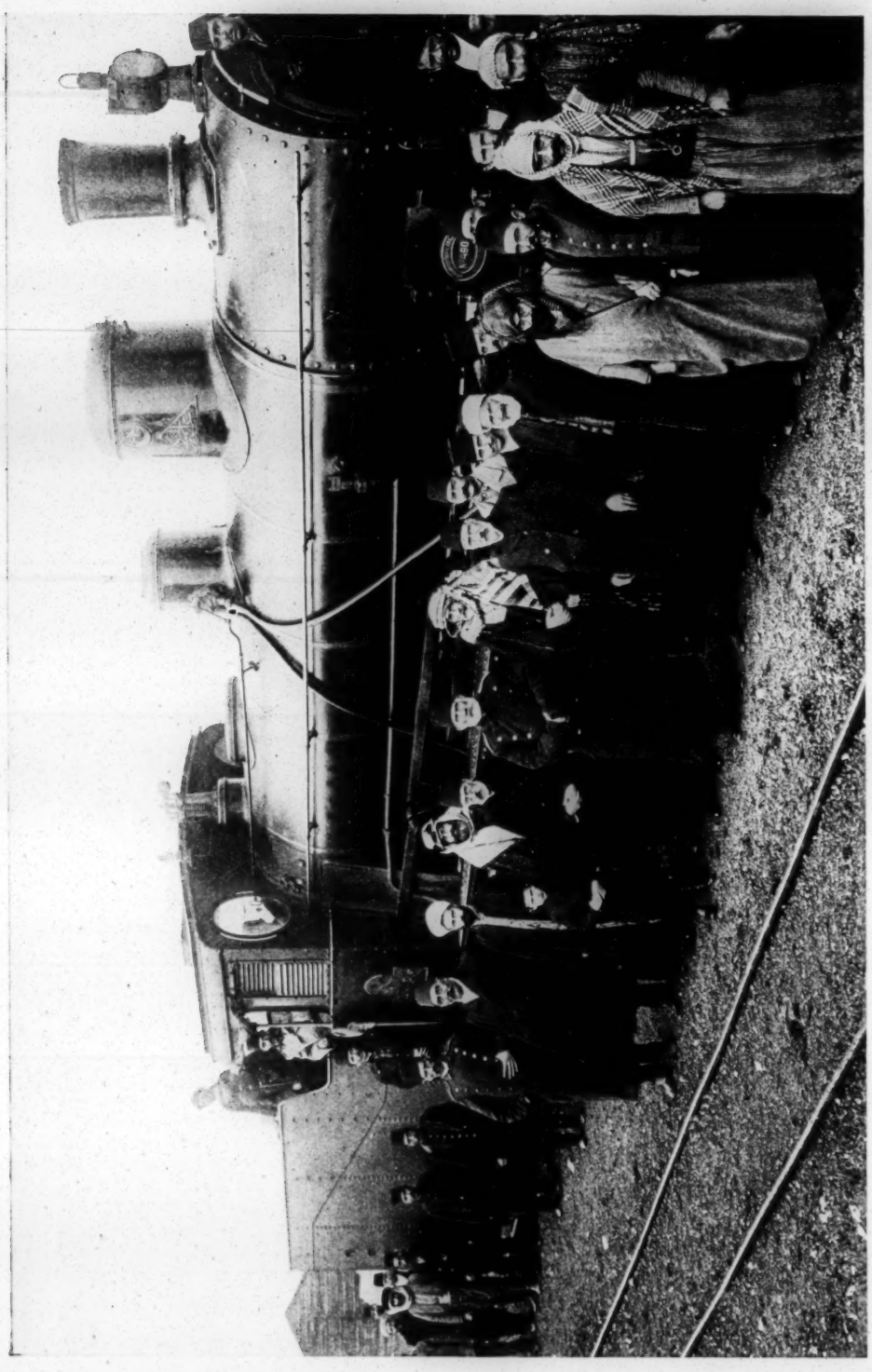
Its inception is due to the initiative of the present Sultan, and the enthusiasm created by its first announcement brought in subscriptions from the faithful in all parts of the Islamic world. A special stamp-tax forms a solid annual contribution to the expenses, somewhat less evanescent than other contributions may prove to be.

Geographically, the line has provided

* Abstracted from the Geographical Journal of London.

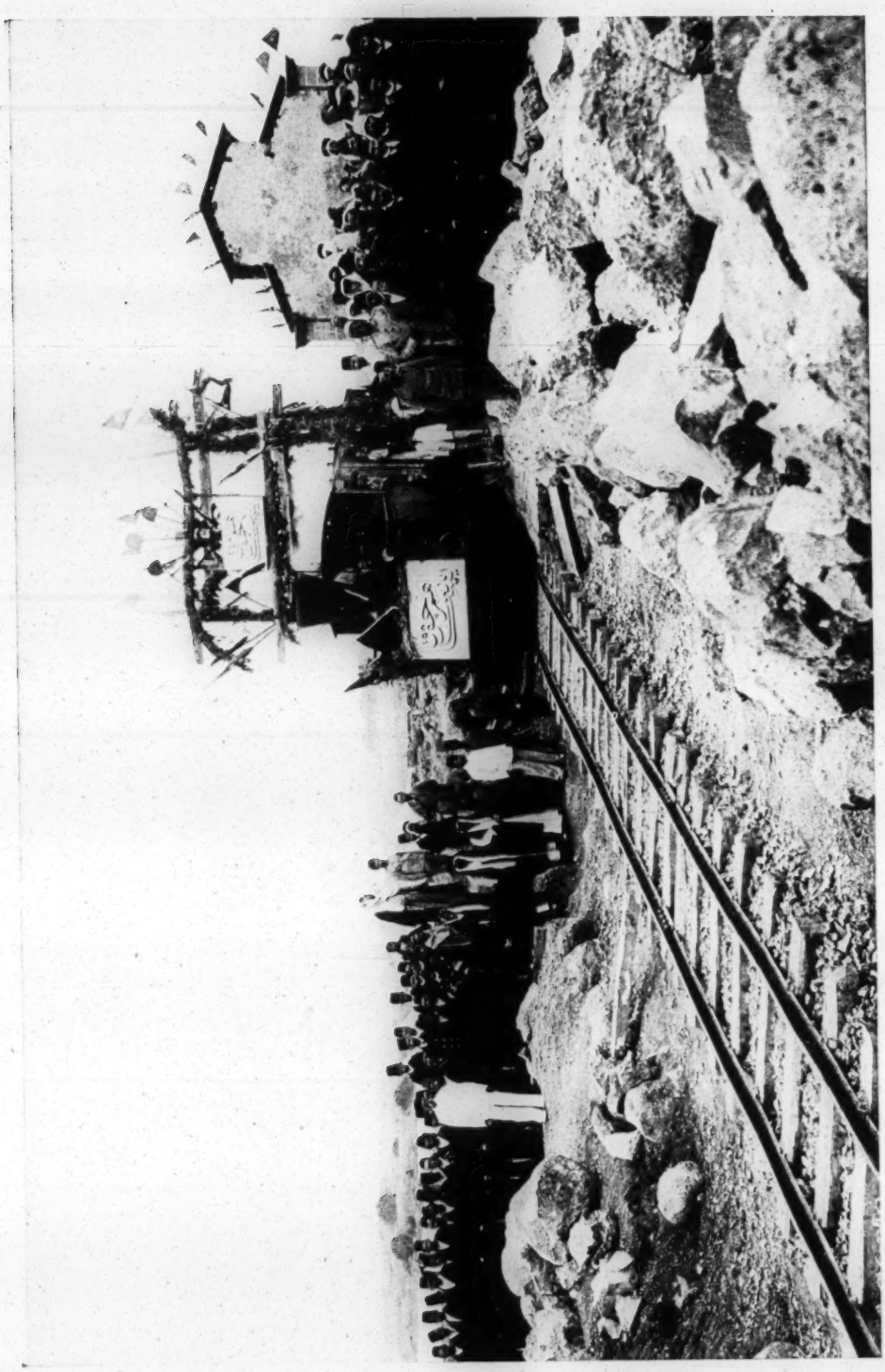
† There are still many of the more rigidly orthodox who prefer the long, tedious journey by camel, with its fifty-two stages from Damascus to Medina, and count the hardships involved as part of the duty of pilgrimage.

DEPARTURE OF THE HOLY CARPET FROM DAMASCUS



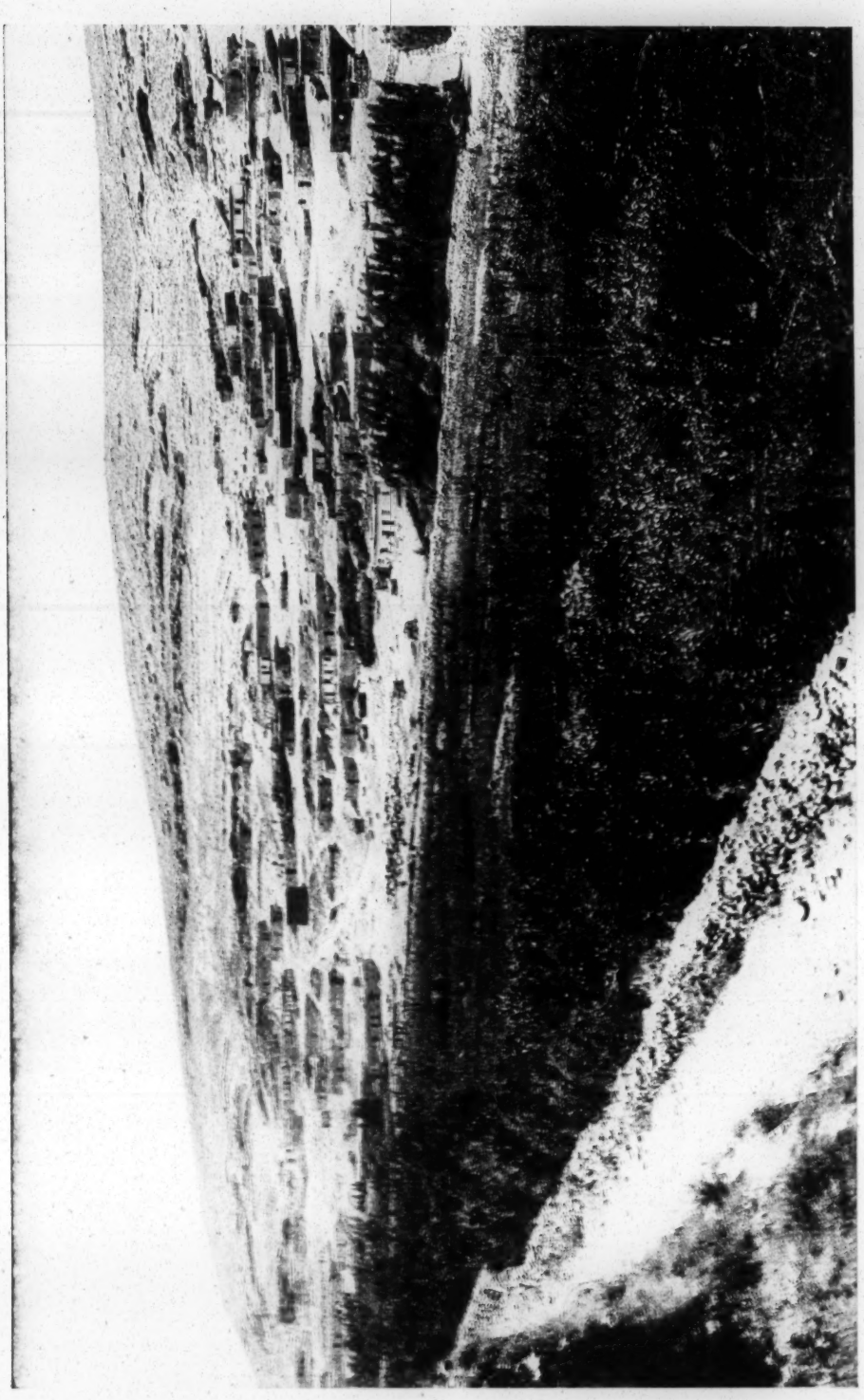
ENGINE "ABDUL HAMID" ON THE MECCA RAILROAD

Note the star and crescent, the national emblem of the Ottoman Empire



CELEBRATING THE DEPARTURE OF THE FIRST TRAIN LEAVING DAMASCUS FOR MEDINA

A CITY IN THE DESERT: MAAN (SEE PAGE 163)



A VIEW OF TEBUK, ONE OF THE PRINCIPAL TOWNS ALONG THE ROUTE OF THE MECCA RAILWAY (SEE PAGE 164)

A TYPICAL FORT IN ARABIA ALONG THE CARAVAN ROUTE TO MECCA
Inside these forts the pilgrims bound for Mecca found shelter at night

a means of travel in a country with a fascination of scenery quite peculiar to itself and unlike any other part of the world. Instead of traversing populous countries and great cities, it seems to delight in passing through immense solitudes—through a country peopled mainly by the spirits of the Arabian Nights, where little surprise would be occasioned in finding a roc's egg in some inhospitable, rocky valley, or in seeing a genie floating in a stream of thin vapor out of a magic bottle.

The line commences at the traditional parting-place of the great pilgrimage, the Bawaubet Allah, or Gate of Allah, in Damascus. For the first few miles the line traverses the Hauran, running parallel to the French Hauran Railway. From ancient times this district has been an extremely rich one, and the Romans used it as a granary.

The deep, narrow ravines of the Yarmuk, the ancient Hieroymax, which the line follows in its descent to the Jordan, present several difficulties of engineering successfully overcome. Large numbers of Italian, Montenegrin, Croatian, Greek, and other European workmen had to be employed on the difficult rock cuttings, tunnels, and viaducts of this section.

The Jordan Valley, where the line crosses it, is 800 feet below Mediterranean level; but the difficulties of construction cease when the Yarmuk Valley has been successfully traversed, and the ascent to the sea is made by easy gradients.

South of Deraa the main line soon leaves the richer corn land and enters an upland, undulating country, the land of Bashan, producing abundant grazing in the spring. At that season troops of gazelle roam about the country, and the Bedouin, with vast herds of camels, are found close to the line.

The landscape gets bleaker as the train moves south. The mountains of Moab are passed some distance to the west, and the trace is laid far out in the desert, where the valleys are wide and easy to cross, and before they deepen into narrow ravines as they enter the mountains.

The old pilgrim route is followed very closely throughout, and at the stations the stone cisterns and reservoirs, to provide a supply of water to the pilgrims, are noticed. Water becomes very scarce; in a few places wells have been dug and water is raised by wind-pumps. For some reason boring for artesian wells does not seem to have been tried. One attempt was made in rocky ground, and when the drills broke no further attempts were made.

As the line approaches Maan an extremely desolate country is traversed. Low ranges appear to the east, apparently of sandstone or limestone formation, although the ground is strewn thickly with black fragments of obsidian along some sections of the line. The ravines now trend eastward, to lose themselves in a wide depression in that direction, as shown in the recent maps of this country by Prof. Alois Musil. Maan is the first point since Amman where water is procurable in any quantity, either from springs in the small town itself or from wells at the railway station. The place is a large railway center, with several stone buildings for officials, a small shop for temporary repairs, a hospital, and quite a good hotel—a substantial building, rather small in size. The small town, containing some good stone and mud houses, is not visible from the railway, but lies beyond a hill nearly a mile off. Two copious springs supply the necessary water.

Date palms are reared; small gardens with various kinds of fruit trees and a few fields of corn are visible, but from a little distance the place is little else than a drab patch on a gray landscape. Its principal distinction is its proximity to the rocky city of Petra,* a ride of some eight hours to the west among the Moab hills. The climate of Maan is invigorating, both in winter and summer, as the place stands 3,525 feet above sea-level, surrounded by the dry, invigorating air of the desert.

The principal drawbacks are the severe

* For a description of this wonderful rock city see NAT. GEOG. MAG., May, 1907.

dust-storms. Rain is not uncommon in the spring, and then a tinge of green spreads over the landscape. The ancient fortress of Petra and now Maan owe their importance as standing at the gate of Arabia, and forming the last outpost of Syria and Western civilization before the long, dreary stages of the northern Arabian journey.

For countless ages—long before the present pilgrimages—this was the route by which the gold, frankincense, and Arabian products found their way into Syria; but the Suez Canal and steamer transport by the Red Sea seem to have abolished all, or almost all, trade prospects, and only the pilgrims remain.

On leaving Maan it may indeed be said that all hope of dividend is left behind, and the line enters a spirit world without towns or even inhabitants. The stages south of Maan, the old pilgrim route, were the most desolate of all, and the way was always strewn by dead and dying camels as the caravan toiled along. The line crosses a constant succession of small wadis.

Some 50 miles south of Maan comes the most remarkable change in the landscape, and the veritable gate of Arabia and the home of the genie is at last reached. The line arrives quite suddenly at the edge of the curious escarpment known as the Batn-el-Ghrul, or the Hollow of the Genie.

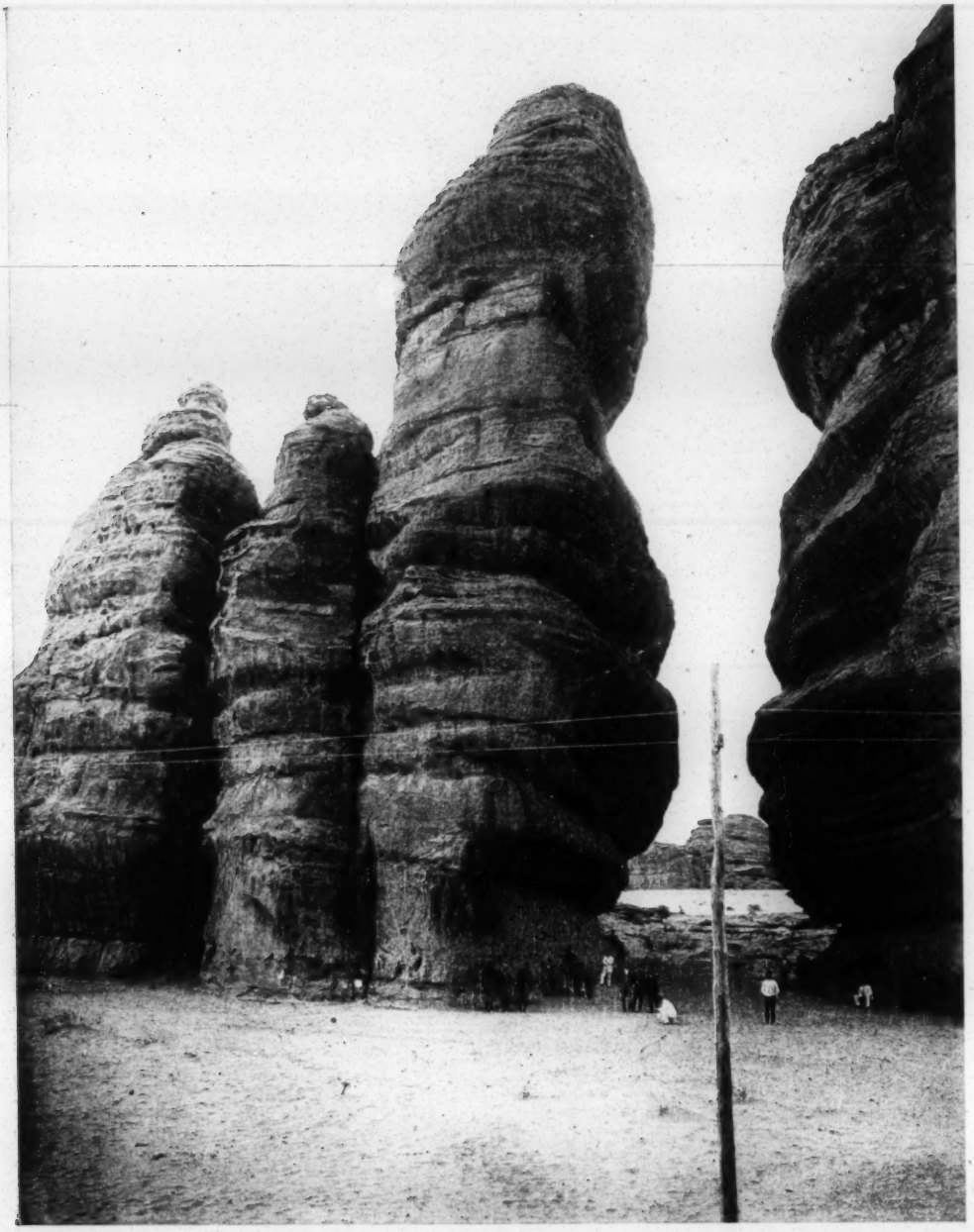
From the station of Batn-el-Ghrul, at the top of the descent, the traveler can walk to the edge of the cliff and take in the immense extent of view which unfolds itself to the south. The escarpment is visible for some 20 miles to the east and is a sheer cliff without, it is said, a single passage of descent. For some 15 miles to the west, also, the escarpment is fairly well defined, until it merges in the high ranges overlooking the Gulf of Akaba. The pilgrim route follows the descent close alongside the line and is comparatively easy. The principal descent is from 3,207 feet at the summit to 3,278 at the foot of the escarpment, or 329 feet altogether.

The view from the summit is extremely striking and comprises a great inland depression, walled in by a continuation of the escarpment on the east, and glowing throughout in the most brilliant and striking colors. The prevailing note is bright red and yellow, changing to violet, purple, and black, so that every tint except green seems to be supplied. The escarpment is of sandstone, which seems to have worn away in some places to sand-drifts of all colors, but principally red and yellow. The spurs of the Tel-esh-Shahim, which run out parallel to the line, are covered with glistening black rocks, at first sight volcanic, but, as I was told by an engineer, they were really of sandstone blackened by the intense heat of the sun. The depression extends south for a distance of about 120 miles. In this clear, dry air every feature is visible. Inquiries regarding the country to the east gave it as an almost waterless region, although a route does exist from Maan to Jauf along which some scanty wells can be found. Towards the Red Sea the district is said to contain a few villages, and a sufficient supply of water from small springs.

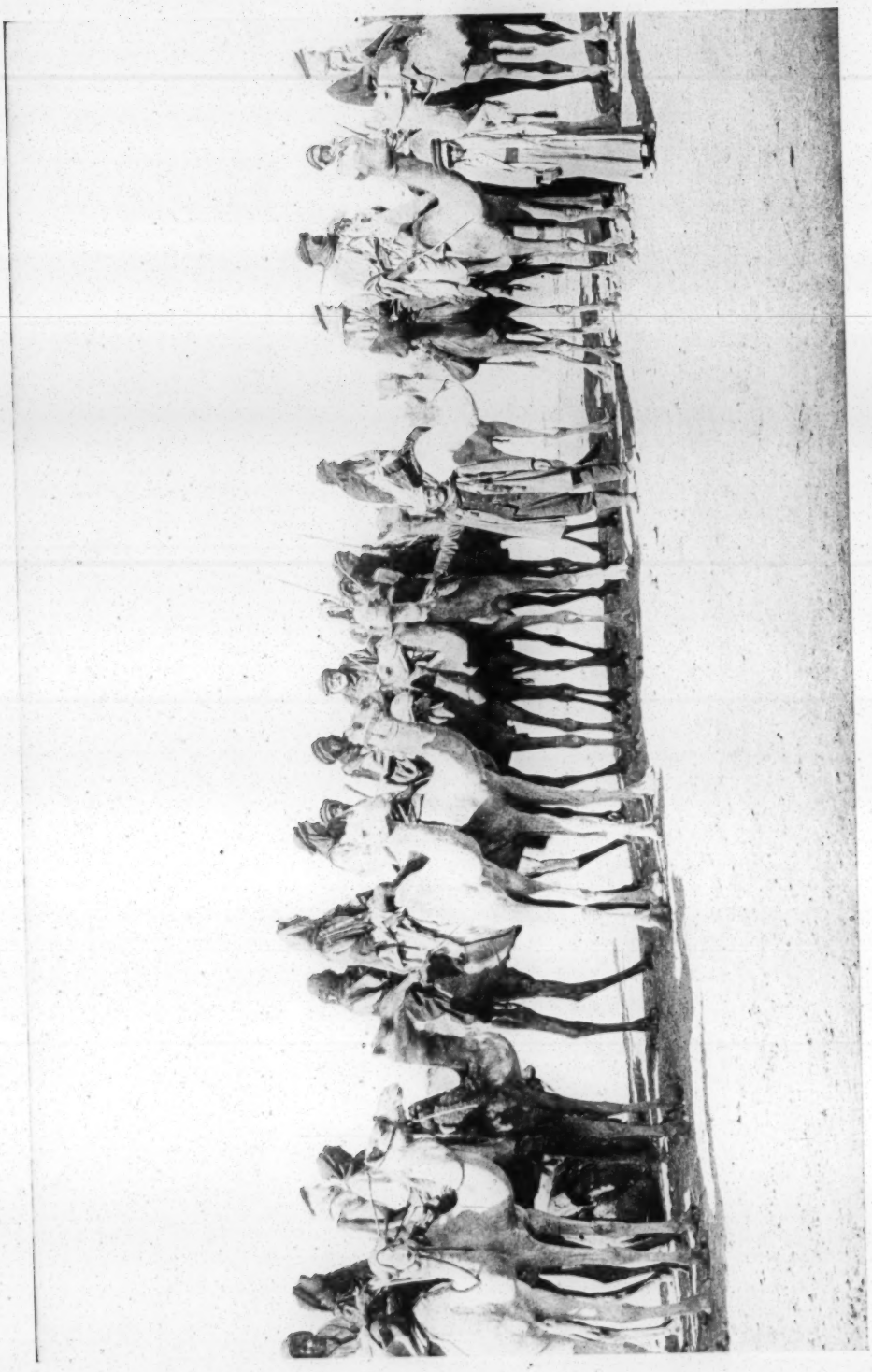
An endless series of beautiful mirages unfold themselves as the train toils slowly along these two lines of steel leading through an endless expanse of sand and rocks, varied with an occasional volcanic outcrop raising black-topped hills.

At Tebuk, 430 miles from Damascus, is the first oasis of any size, and here a depot has been formed, at which the railway can recoup itself before another long stretch of nearly waterless desert is entered and the next depot at El Ula reached. A group of buildings for the employés, a small repairing shop, and a hospital with sixty beds form the principal part of the depot.

Tebuk consists of a group of date palms about a half a mile square, deriving water from a large spring walled round in a concrete basin and watched over by another of the masonry forts which mark a pilgrim station. Altogether there were about sixty mud houses, with a few walled gardens be-

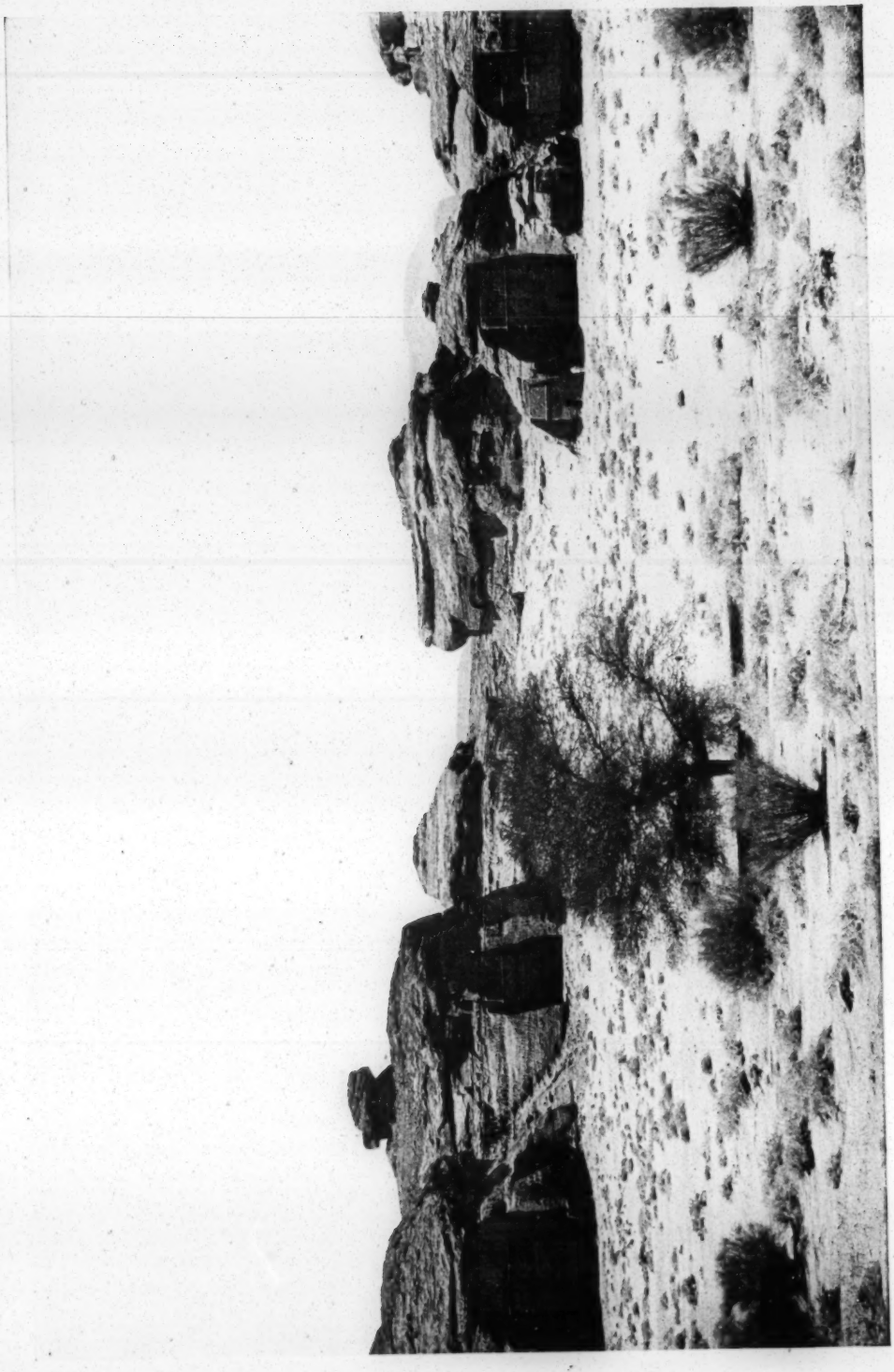


MOUTAKA PILLARS IN ARABIA, SEEN FROM THE RAILWAY TO MECCA



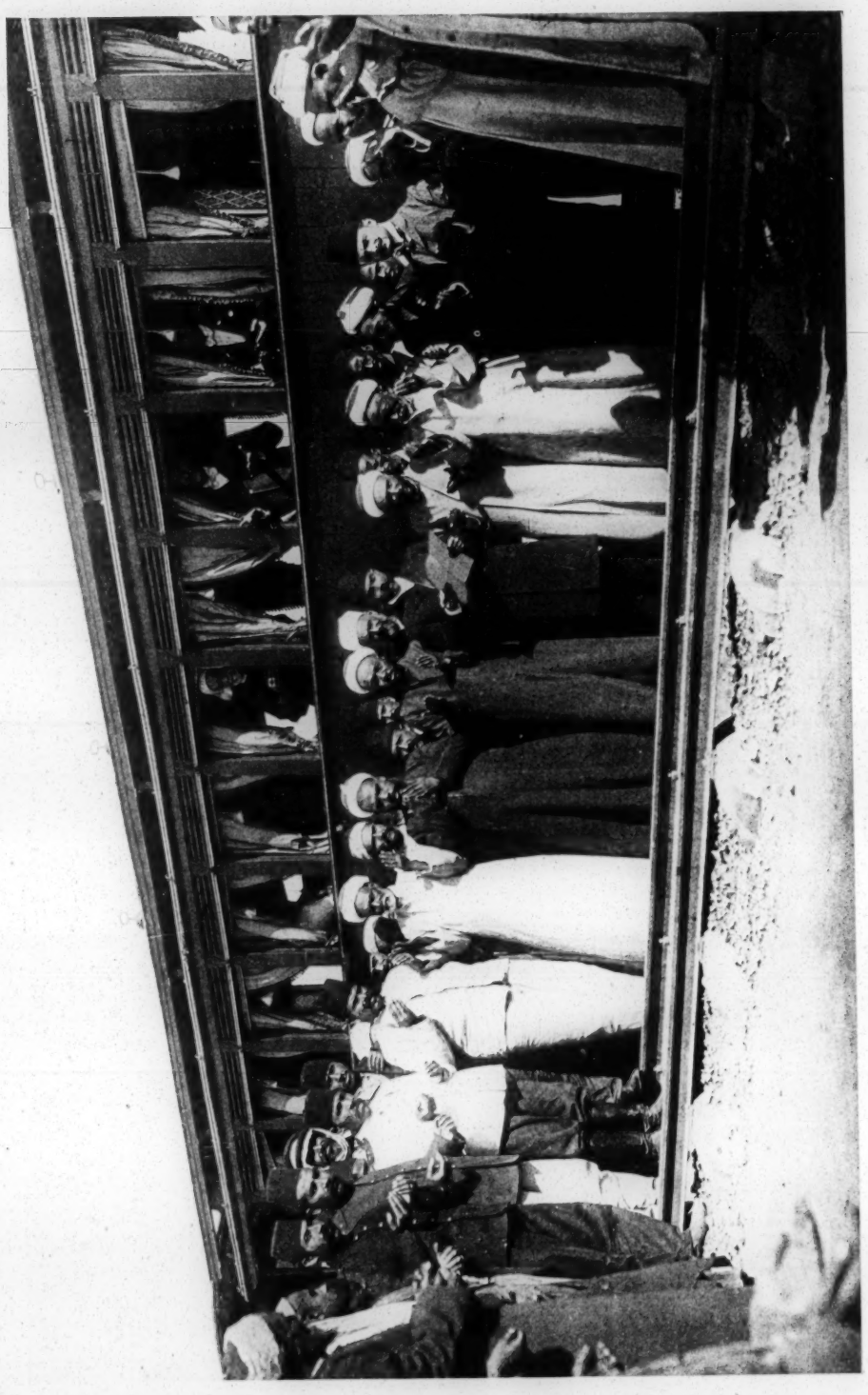
SHEIKS FROM THE DESERT COME TO TEBUK TO SEE THE FIRST TRAIN

INAUGURATING THE OPENING OF THE RAILROAD AT TEBUK BY SACRIFICING SHEEP



ROCK-CUT TOMBS AT MEDAIN SALIH (SEE PAGE 171)

A RAILROAD CAMP IN THE DESERT



HIGH PRIESTS IN MEDINA WELCOMING THE FIRST TRAIN FROM DAMASCUS

longing to the permanent inhabitants of Tebuk. All that were seen were of a distinctly negroid type, different from the nomad Bedouin. The surrounding country is but sparsely inhabited by Arabs.

Besides date palms, there are in the gardens a few lemon trees and pomegranates, and outside are some few fields of wheat, cultivated principally as green fodder. The Italian engineer in charge of this section had managed to make a garden in the sand, where by means of irrigation he grew most kinds of European vegetables, but none of the inhabitants seemed inclined to copy his example.

It seems certain that Mohammed visited Tebuk in his earlier wanderings, and tradition refers to Jebel Sherora as the Pulpit of the Prophet, probably from its commanding position overlooking all the surrounding country.

The rainfall in this country is extremely capricious, and perhaps two or even three years may elapse before there is any appreciable fall here, although at Maan there appears to be always some rain in the spring.

Of animal life there appears to be very little. An antelope, which the Turks call a wild cow, but which looks to be *Oryx beatrix*, is to be found in this district, but only in small numbers. The large troops of gazelle seen north of Maan do not roam here. It is said that the ostrich is occasionally found, and the skin of one specimen is preserved in Maan station.

The desert air is extremely dry and clear, always invigorating, and even the great heat in summer is not as insupportable as in a damper climate, where the thermometer is probably lower. Climate has, without doubt, a great effect on the human character and intellect, and the nervous, high-strung temperament of the Arab is to a great extent the creation of his environment of desert, with its splendid mirages to fire the imagination and sparkling air to keep the nerves always alert.

South of Tebuk want of water is again a great difficulty, and the small posts have to be supplied daily from the train.

At Medain-Salih the valley widens a little, and here are found some rock-cut tombs similar to those at Petra, but far fewer and less ornate. Traces of a town exist, but there is nothing now visible except the usual fort of the pilgrim. Here again, as well as at Tebuk, the site would seem a favorable one for trying artesian wells, but no attempts have been made to prove their success or otherwise.

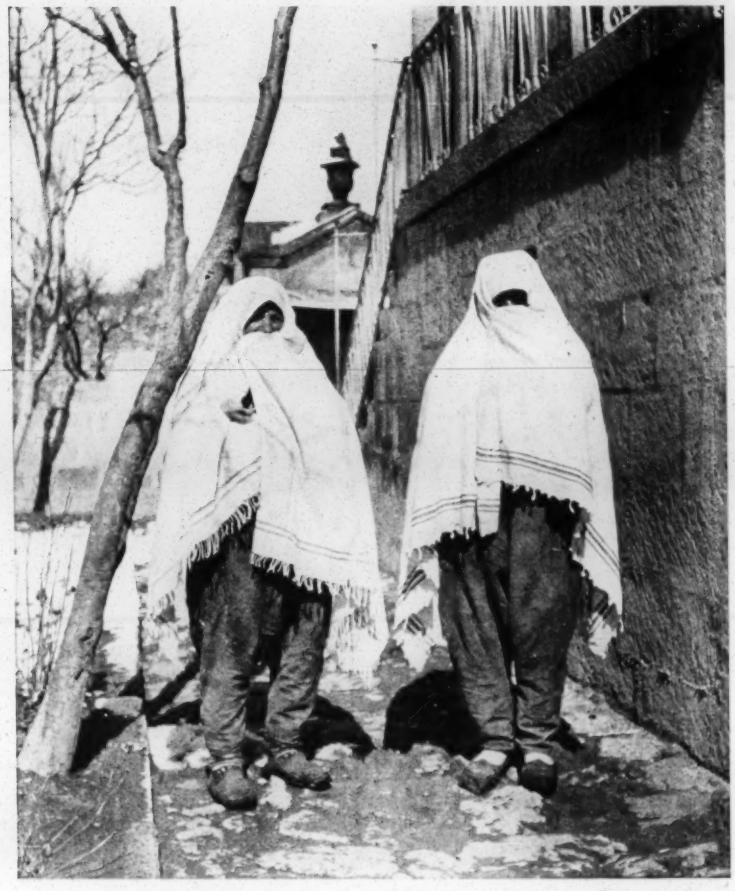
The permanent way has been laid throughout by Turkish soldiers, but the station buildings, all of very solid masonry, as well as bridges and culverts, of which there are a great number, have been constructed mostly by Italian workmen, with some Greeks and Montenegrins. As many as three or four hundred Italian workmen were employed at one time on the works near Tebuk, and so little did fanaticism come into play that they built the fine new mosque at Tebuk. Subsequently they instructed some Turkish engineers, who continued the work from El Ula to the Holy City itself.

It is difficult to think of this railway becoming a great highway or developing any great trade with Central Arabia, as the section from Maan to Medina traverses an unproductive country without possibility of development, and the interior of Arabia has no surplus products to dispose of. In any case, when the line reaches the sea, at Sherm Rabigh, it is probable that any trade, either export or import, to Medina or Mecca will pass through that port in preference to the long land journey.

The following summary of distances shows the extent of the line:

Damascus to Maan	285	miles
" to Tebuk	430	"
" to El Ula	609	"
" to Medina	820	"
" to Mecca	1097	"

The gauge of the line is the somewhat curious one of 1.05 meter (3 feet 5¼ inches), which was necessary, when the line was first commenced, to correspond



MOSLEM WOMEN IN A VILLAGE OF ASIA MINOR

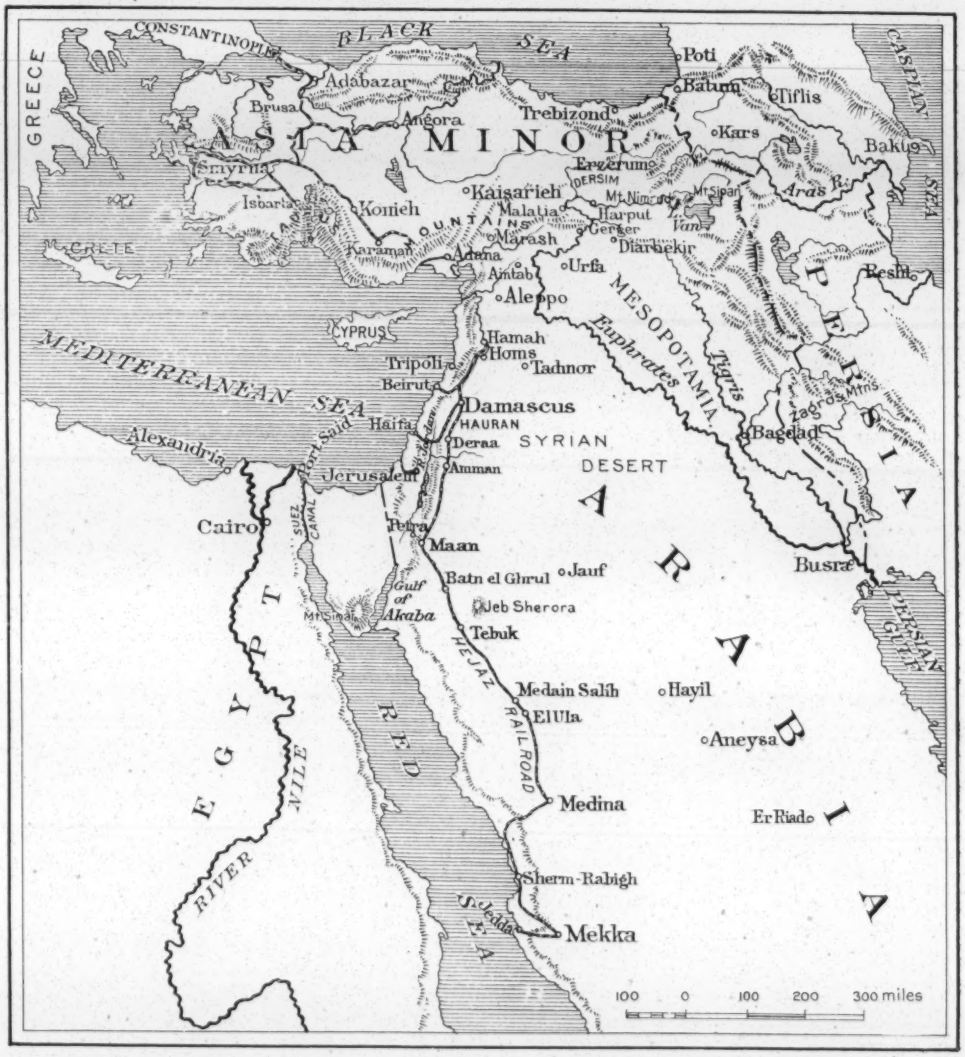
with the gauge of the Beirut-Damascus line, over which the rolling stock had to be brought. The branch to the Mediterranean, at Haifa, was constructed subsequently. The rolling stock has been obtained principally from Belgium, with the exception of the engines, which are made by a German firm. The rails were supplied by the American Steel Trust, by a French firm domiciled in Russia, and by the firm of Cockerill, in Belgium.

The engineers in charge of sections were also of various nationalities—French, Poles, Hungarians, etc.—while the guiding spirit in the construction has been Meissner Pasha, a very able German engineer. But besides these the general direction has been under Marshal Kiazim Pasha, to whom the greatest credit is due in bringing the line successfully into Medina, and to Hajji Mukhtar Bey, a brilliant Turkish engineer, who has absorbed all modern methods of construction, and completed the last section into Medina without European assistance.

In conclusion, it is difficult which to admire the most, this far-reaching conception of His Majesty the Sultan—to build the line and thus to further the interests of his religion and bind together the outlying portions of his empire—or the silent, unswerving devotion of the Turkish soldier who has carried the matter to a conclusion, and who watches without complaint over miles of line through a country almost without water or inhabitants.

SCENES IN ASIA MINOR

THE quaint pictures of the people and country of Central Asia Minor, given on pages 172-193, were sent to this Magazine by Mr H. W. Hicks, of New York, a member of the National Geographic Society. Nearly all the illustrations are from Mr Hicks' camera. They admirably portray every-day life in the Asiatic provinces of the Ottoman Empire, described by Mr Ellsworth Huntington in "The Mountaineers of the Euphrates," published in this number, and in "Sunshine in Turkey," by President Howard S. Bliss, which appeared in the January number of this Magazine.



SKETCH MAP OF ASIA MINOR AND OF THE DAMASCUS TO MECCA RAILWAY

The section from Medina to Mecca is not quite completed

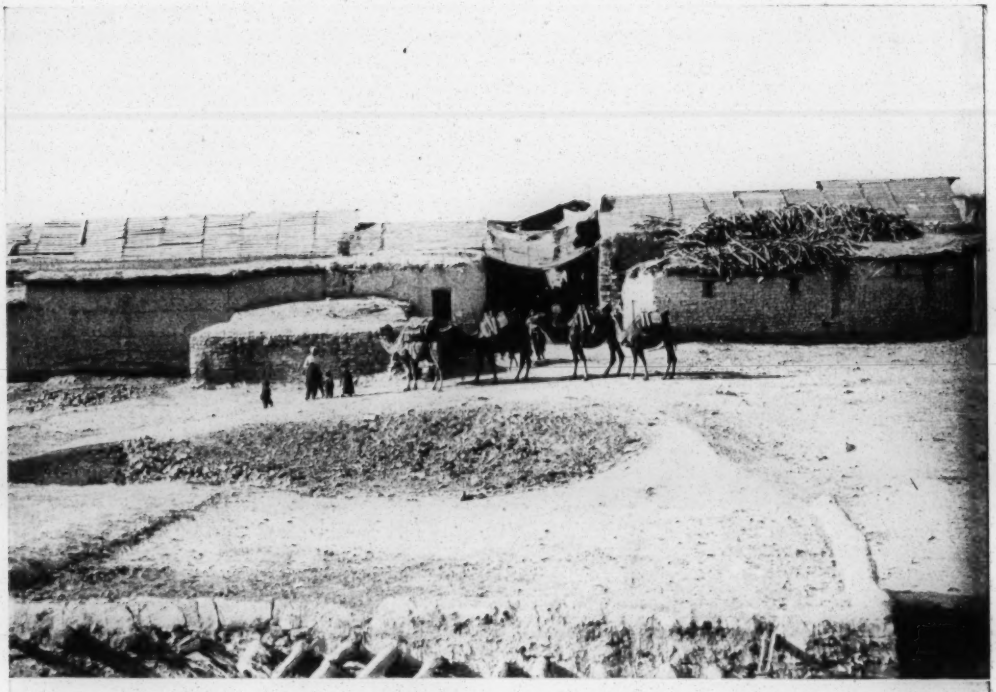
A BULLOCK TRAIN HAULING GRAIN TO MARKET

A YOUNG ARMENIAN COUPLE MOVING TO A NEW HOUSE

The cart wheels are set tight on the axle, which revolves instead of the wheels

A MULE TRAIN CARRYING GRAIN ON THE PLAINS OF ASIA MINOR

SHEPHERD AND ANGORA GOATS



A VILLAGE CARAVANSERAI WHERE TRAVELERS ARE HERDED WITH THEIR PACK TRAINS AT NIGHT

A CAMEL TRAIN TAKING THE NOONDAY REST

THE EUPHRATES RIVER NEAR THE WESTERN BORDER OF MESOPOTAMIA: AN ANCIENT CASTLE ON CLIFF ON LEFT

IN THE GORGE OF THE TIGRIS RIVER: TAURUS MOUNTAINS

This is the location of the most famous and richest copper mine in Turkey

ARMENIAN CHILDREN IN AN AMERICAN SCHOOL IN ASIA MINOR

TWO BLIND ORPHANS IN THE AMERICAN SCHOOL FOR THE BLIND: URFA

A TURKISH WOMAN CARRIED ON A NATIVE LITTER TO THE AMERICAN CHRISTIAN HOSPITAL: AINTAB

WOMEN WAITING FOR TREATMENT IN THE AINTAB DISPENSARY: MOSLEMS ON LEFT, ARMENIANS ON RIGHT

THE CARPENTER SHOP IN THE AMERICAN INDUSTRIAL SCHOOL: URFA

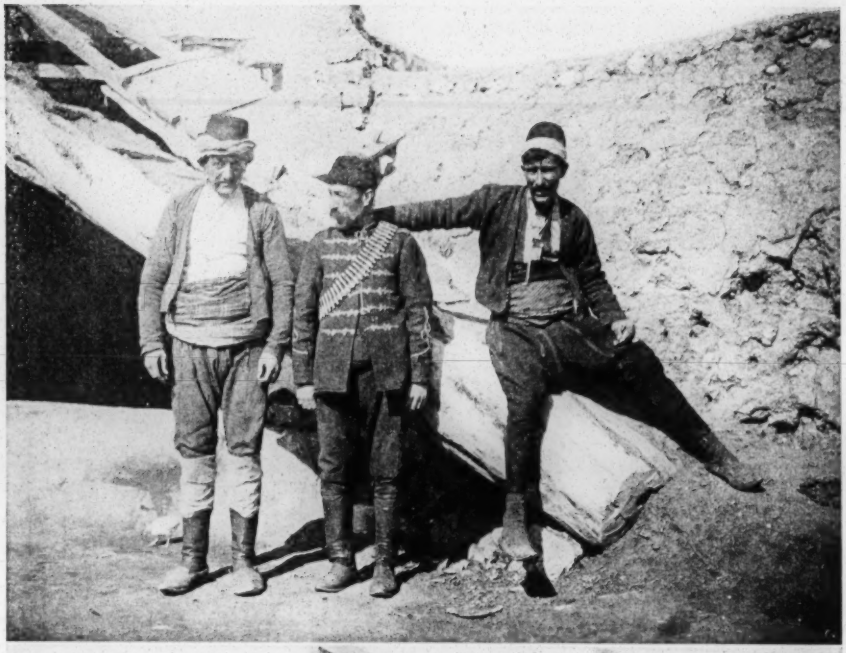
ARMENIAN ORPHANS FROM THE MASSACRES OF 1894-5 IN SCHOOL SUPPORTED BY THE SECOND ARMENIAN EVANGELICAL CHURCH OF AINTAB

VILLAGE WOMEN SORTING COARSE NATIVE GRAIN, WHICH HAS BEEN BOILED AND DRIED

VILLAGE WOMEN SPINNING NEAR URFA

A CARTLOAD OF GRAPES: ASIA MINOR

ARABS, ONE WEARING KURDISH COSTUME AND THE OTHER A SHEPHERD'S FUR COAT: ASIA MINOR



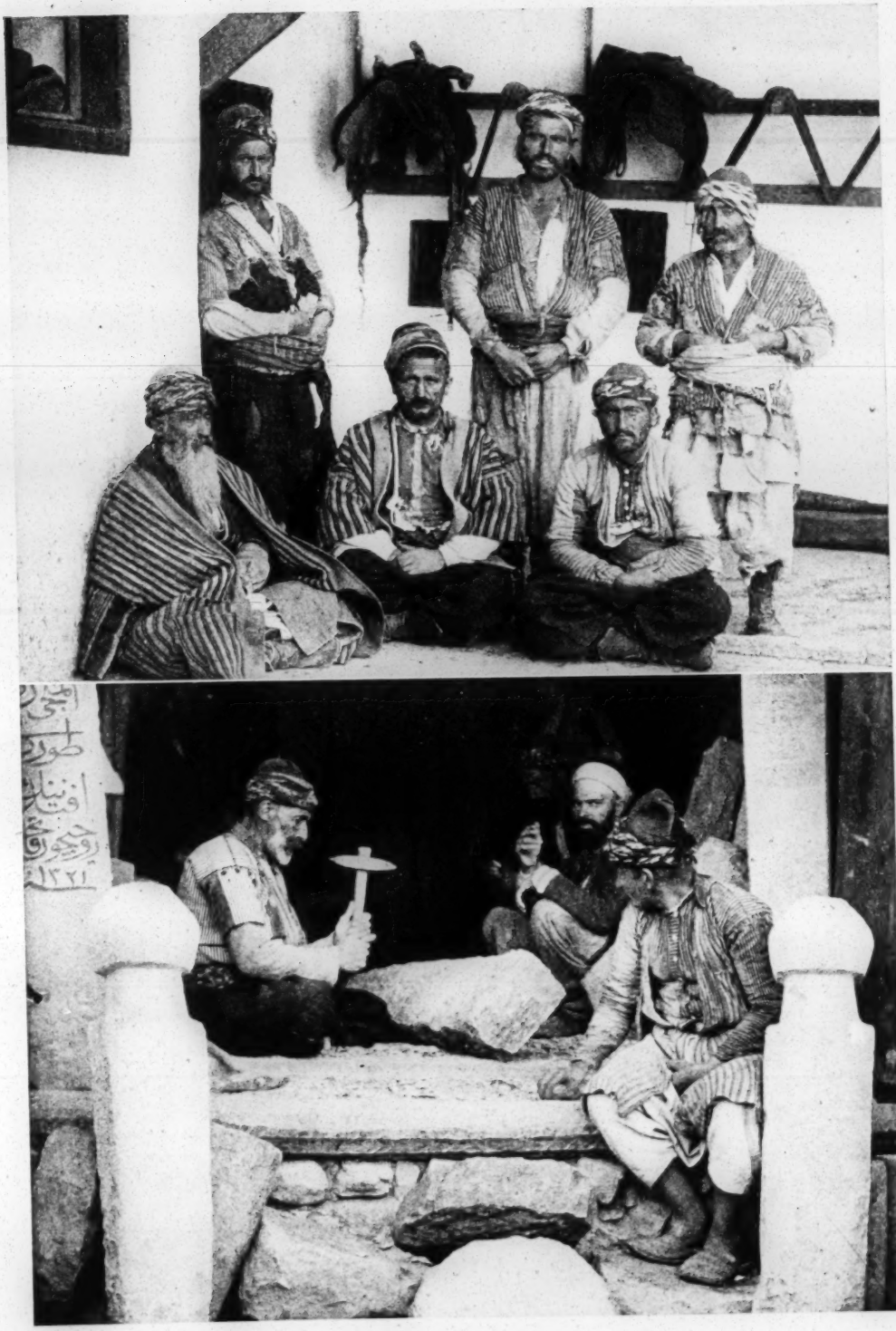
A TURKISH POLICEMAN AND TWO TURKISH DRIVERS

TURKISH TROOPS WHO ARE BEING TREATED IN THE CENTRAL TURKEY COLLEGE HOSPITAL: TWO DAYS NORTH OF ALEPPO

ARABIAN BOYS IN A LONELY KAHN ON THE DESERT OF MESOPOTAMIA

SCENE IN A GREGORIAN CHURCH SCHOOL IN MESOPOTAMIA

Note priest in background



ARMENIANS OF MARASH

MAKING TURKISH TOMBSTONES

CITY WALL AND PRECIPICE SURROUNDING DIARBEKIR

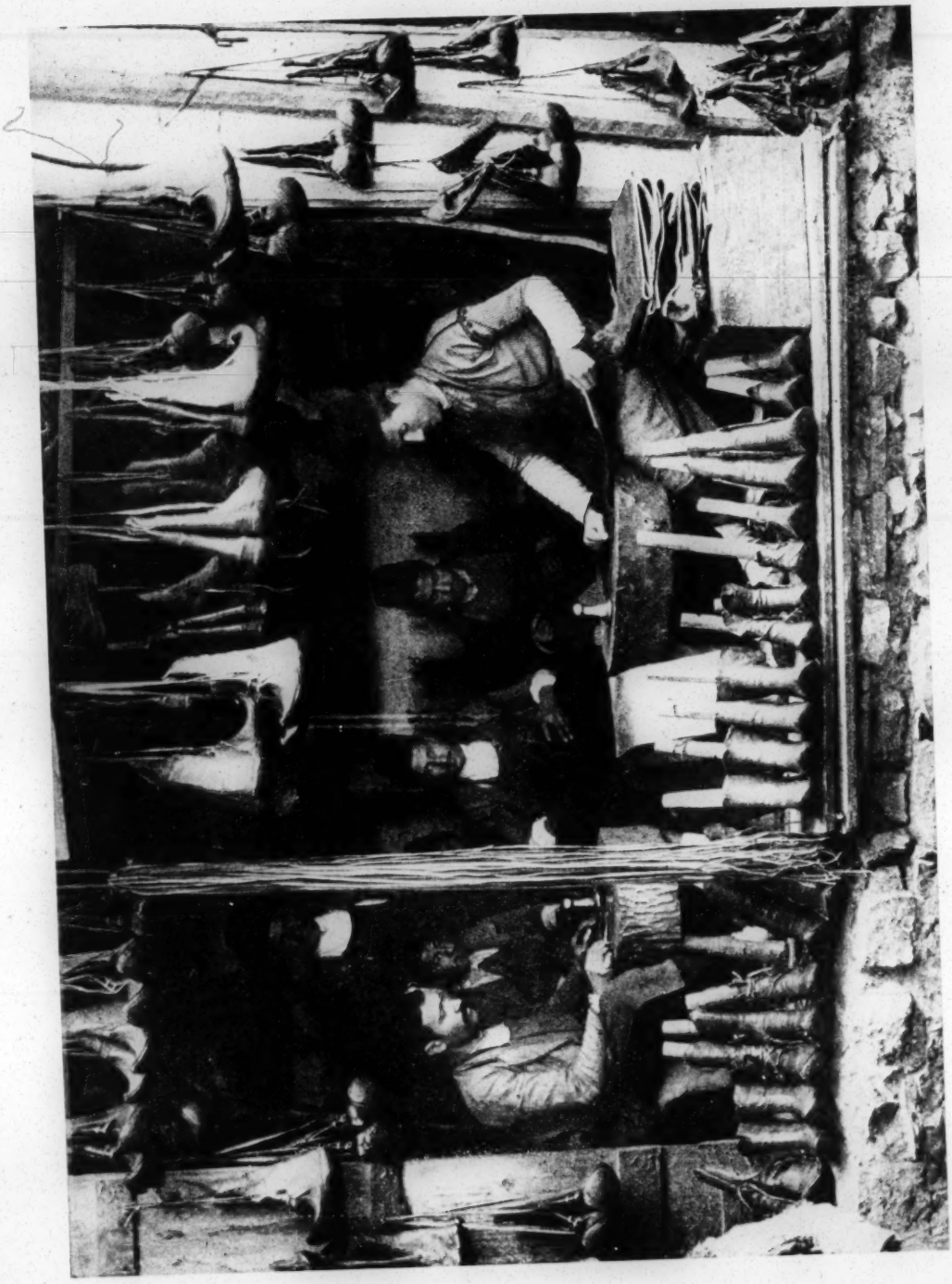
ANOTHER VIEW OF THE WALL OF DIARBEKIR

KURDISH MOSLEMS ON PLAINS OF SURUJ, NEAR AINTAB

Mud houses of conical shape are found only in this region of Western Mesopotamia

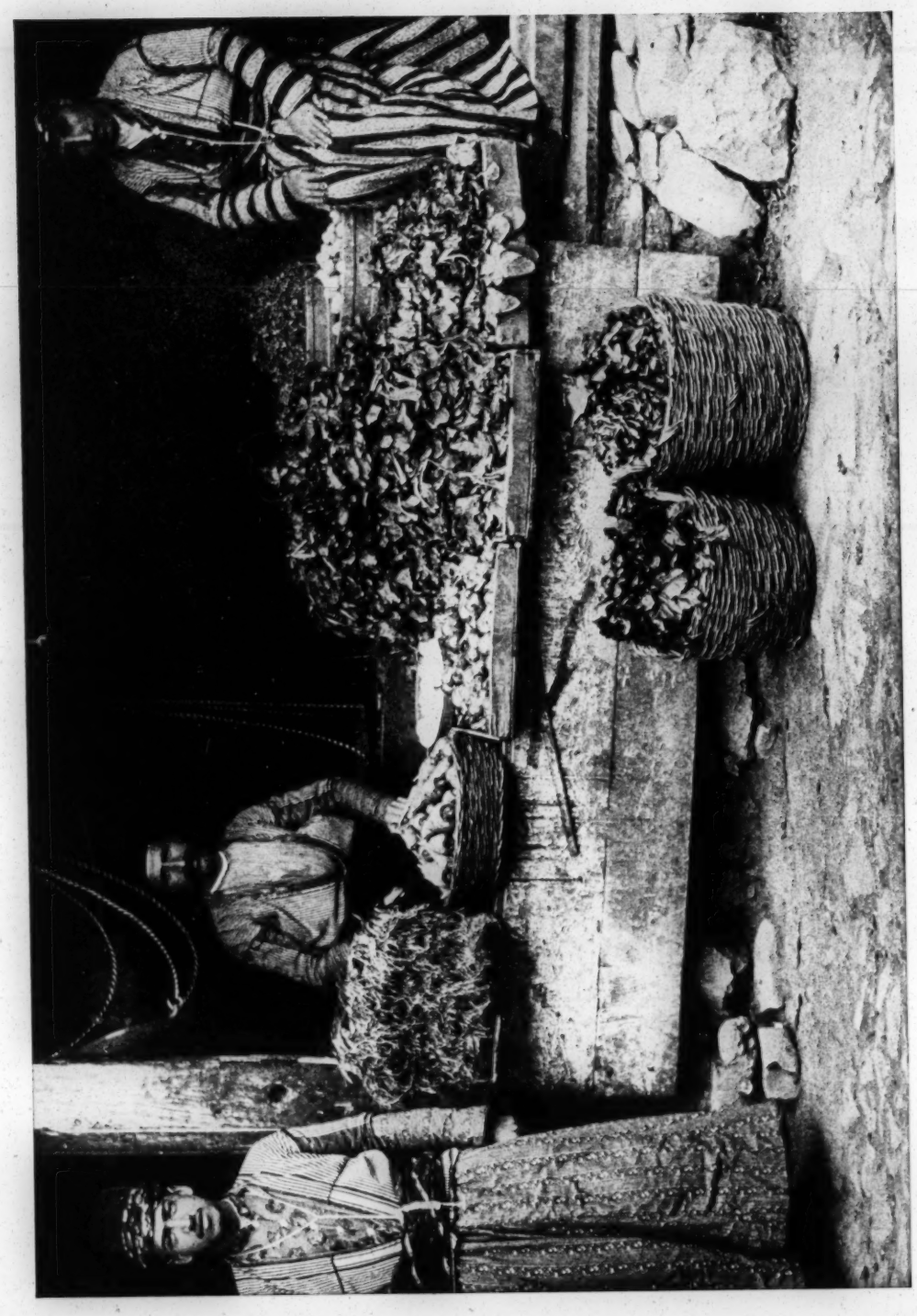
TRAVELING IN ASIA WHERE THE ROADS ARE BAD

MAKING STAMPED AND EMBROIDERED SADDLERY IN A TURKISH TOWN IN ASIA MINOR

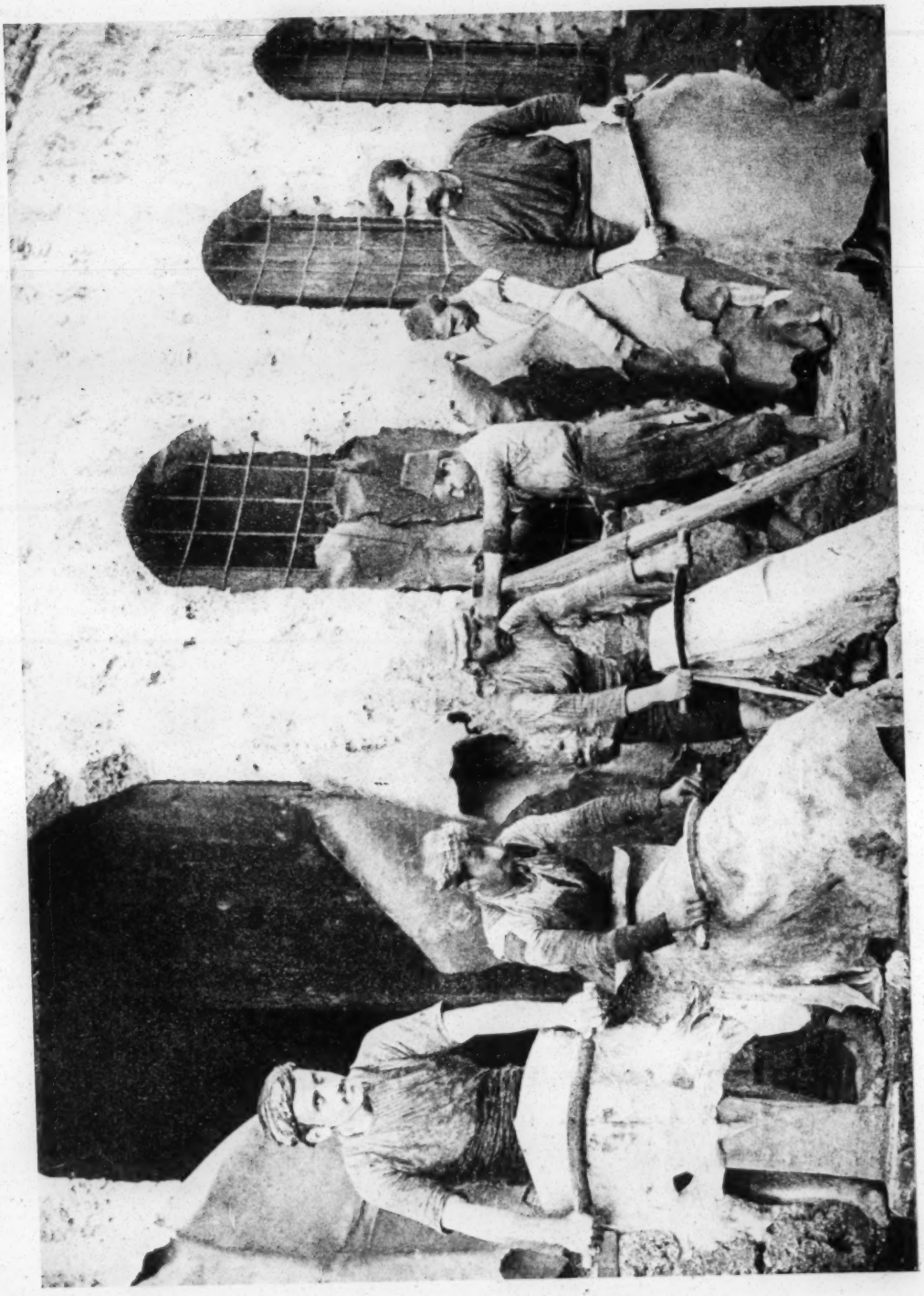


MAKING TURKISH SHOES AND SLIPPERS

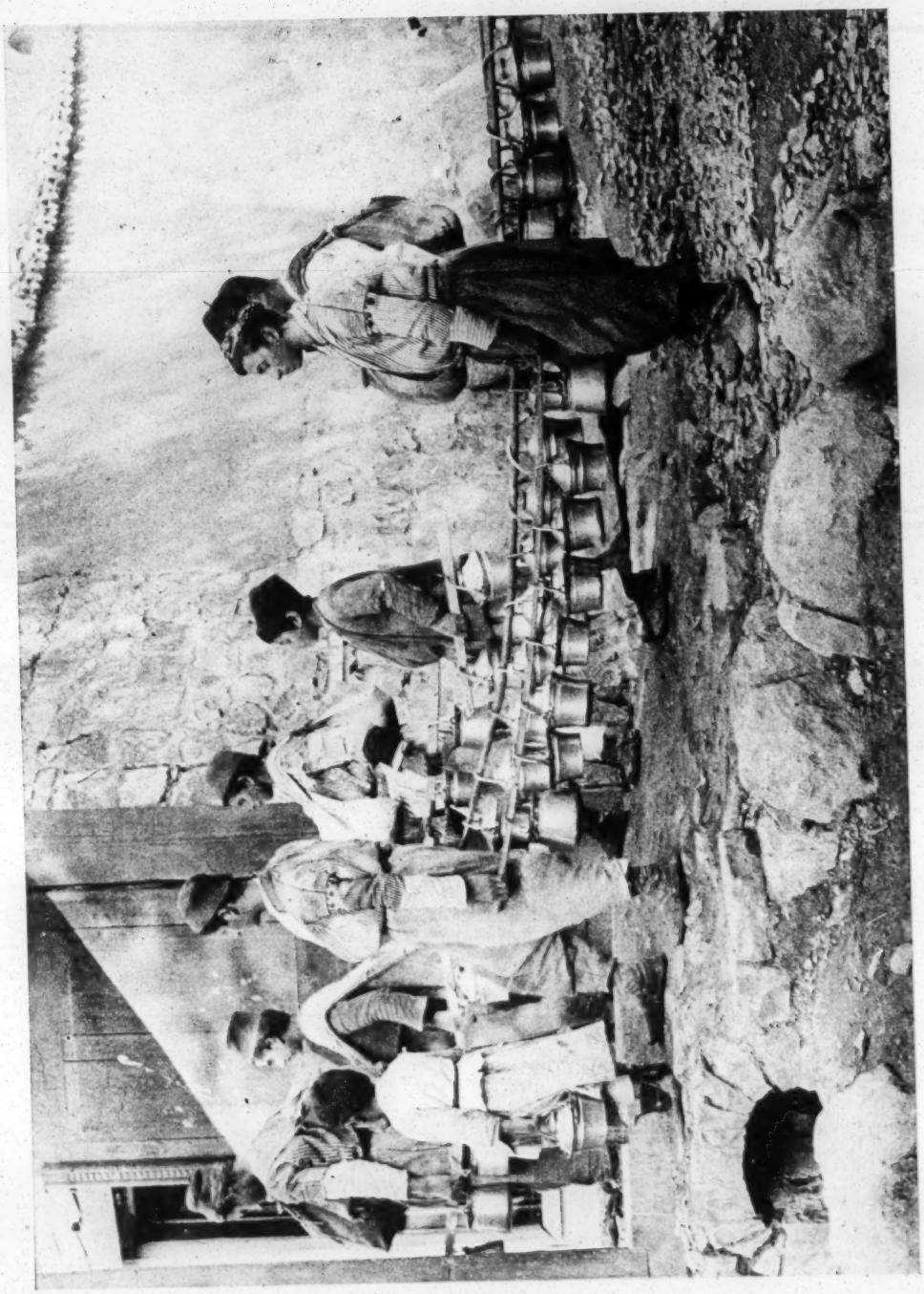
PREPARING COTTON FOR WEAVING: GINNING, BEATING, AND SPINNING: ASIA MINOR



A VEGETABLE SHOP IN A TURKISH TOWN IN ASIA MINOR



TURKISH TANNERS: ASIA MINOR



BOYS CARRYING LUNCH TO WORKMEN IN MARASH

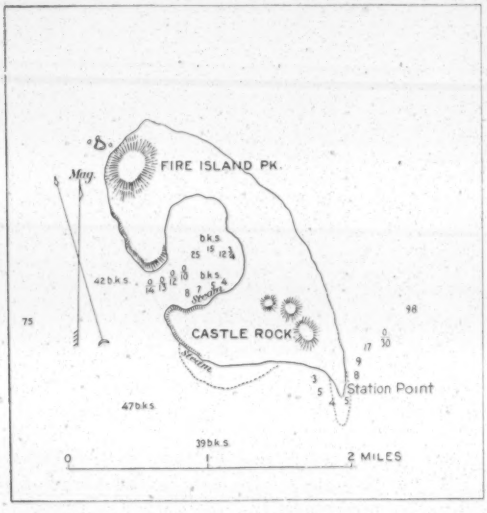
A JACK IN THE BOX

An Account of the Strange Performances of the Most Wonderful Island in the World

By Captain F. M. Munger, Senior Captain U. S. R. C. S.

THE following relating to recent changes that have taken place in the Bogoslof volcano of the Aleutian Islands, Alaska, and the accompanying photographs, may be of interest to the readers of the National Geographic Magazine:

1. Bogoslof volcano was discovered about 1790 by the Russian admiral of



BOGOSLOF ISLAND IN SEPTEMBER, 1908

that name; it was then but one island, now called Castle Island.

2. During the winter of 1886-87 a new island appeared two and one-half miles west-northwest from Castle Island, which was named Fire Island. A narrow neck of land connected these two islands, but a gradual subsidence took place, and by 1900 there was a passage between the two with not less than seven fathoms of water. These islands are probably thrown up from a deep-sea volcano, as they come from great depths, the 1,000-fathom curve being less than four miles to the northwest.

3. During the winter of 1905-06 there appeared a new peak about half way between the old islands. When this peak developed it formed connection with Fire Island and left a passage between it and Castle Rock in which the least depth of water was five fathoms. This peak was surveyed by officers from the United States revenue cutter *Perry*, in June, 1906, and was named Perry Peak (see page 195).

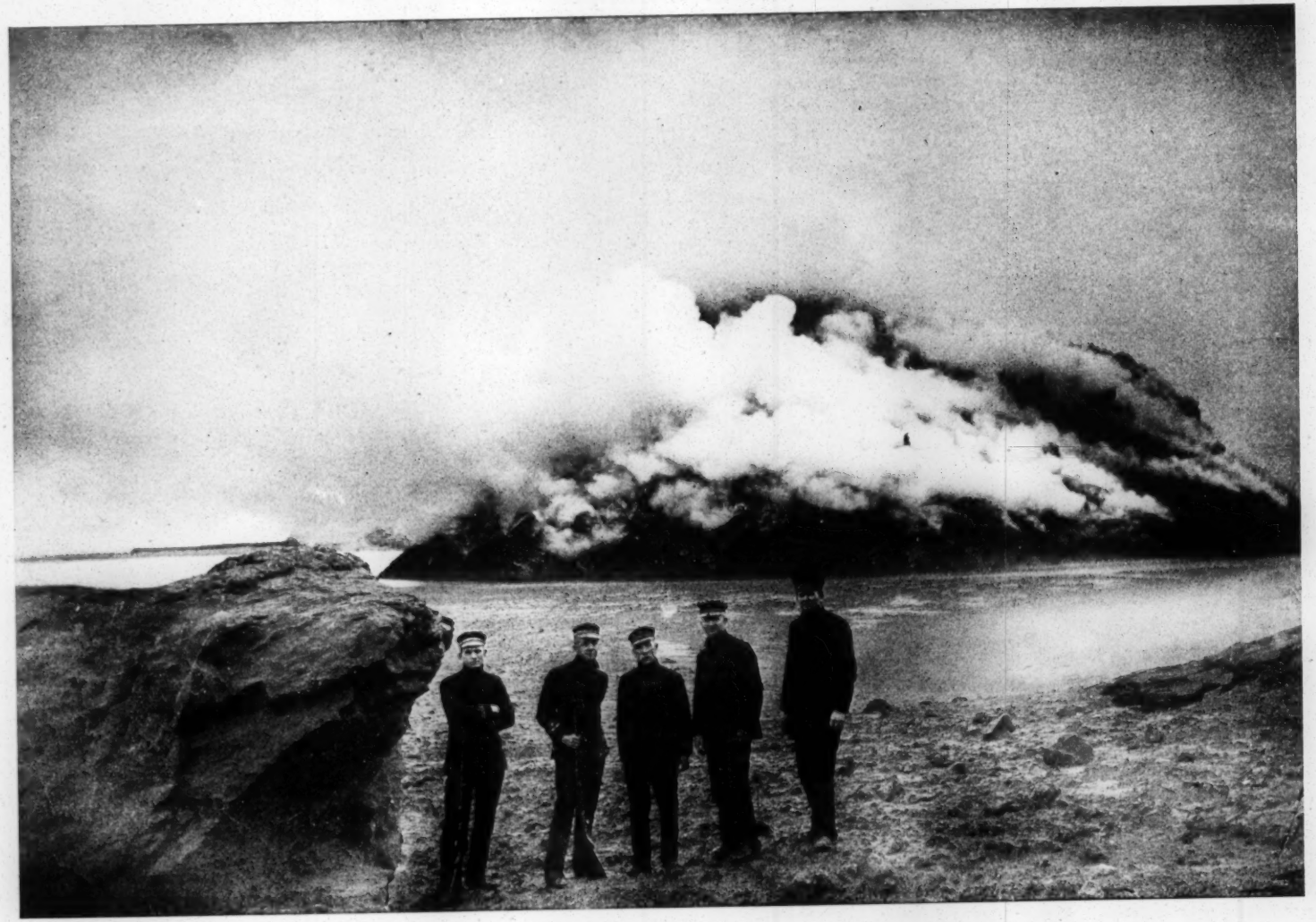
4. During the winter of 1906-07 another peak appeared, absorbing in its uplift about half of Perry Peak, and filling in the space to Castle Rock, thus making one island of the group.

5. July 4, 1907, officers from the United States revenue cutter *McCulloch* made a survey of this peak and named it McCulloch Peak. This peak was 2,000 feet through its base and 495 feet high (see page 196).

6. October 15, 1907, the *McCulloch* again visited the island and found McCulloch Peak had disappeared, and where it stood a large harbor had formed, with outlet to the sea near Castle Rock.

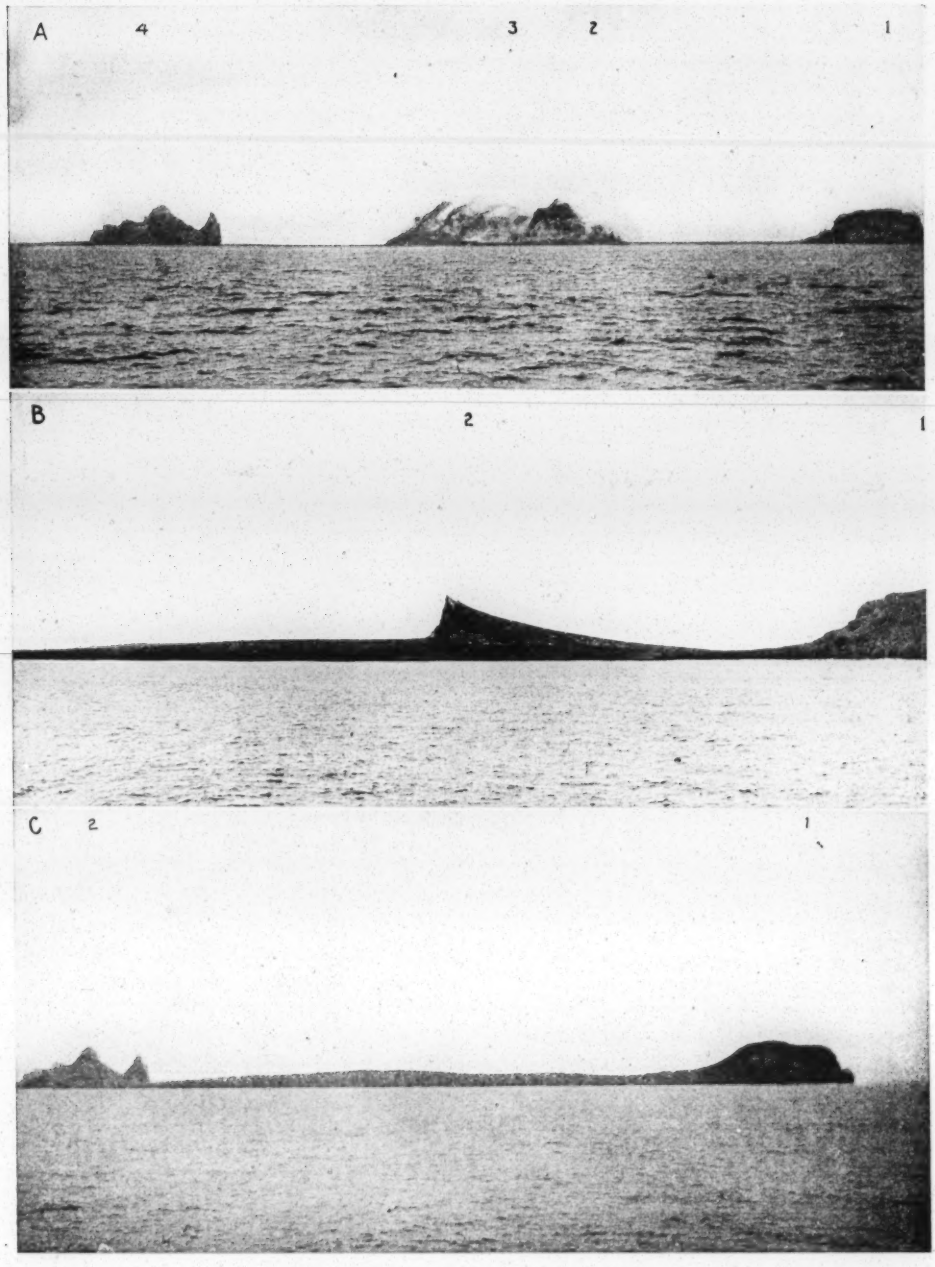
7. It is thought this peak exploded September 1, 1907, as on that date, at 5 p. m., a dense black cloud passed over Unalaska Island, covering the land with ashes, falling to a depth of three-sixteenths of an inch on the board walks in Iliuliuk, sixty miles from Bogoslof.

8. July, 1908, officers from the United States revenue cutter *Rush* made a survey of the island and found great changes. Perry Peak had disappeared; a high ridge of land extended from Fire Island to Castle Rock, having an elevation of about three hundred feet at the highest point; the entrance to the harbor near Castle Rock had filled in, high land formed to the west, and an entrance opened to the west-northwest, near Fire Island.



A VIEW OF PERRY PEAK IN JUNE, 1906

This peak rose from the ocean depths in the winter of 1905–1906. It has since disappeared. Photo from Capt. F. M. Munger



A. PHOTO TAKEN JULY 4, 1907

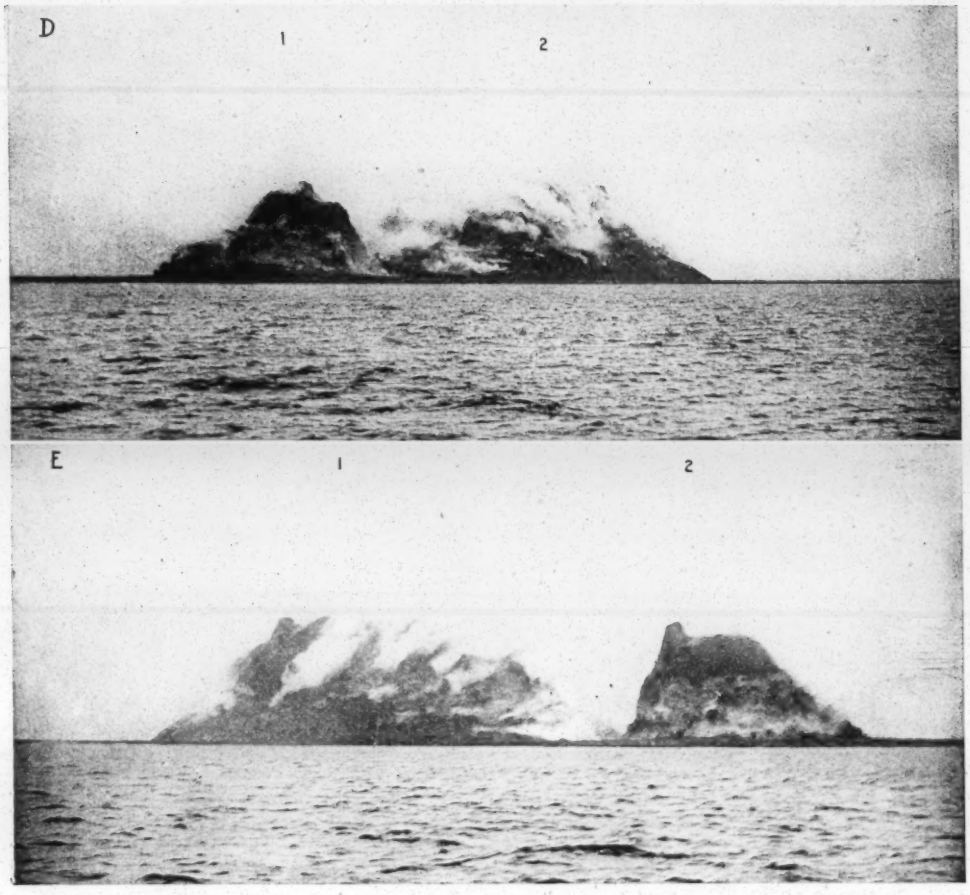
1. Fire Island, which rose from the sea in 1887. 2. Perry Peak, which rose in 1905-06. 3. McCulloch Peak, which appeared in 1906–07. 4. Castle Island, discovered by Admiral Bogoslof in 1790.

B. PHOTO TAKEN OCTOBER 15, 1907

1. Fire Island. 2. Perry Peak. McCulloch Peak has disappeared. Castle Island is off the photo to the left

C. PHOTO TAKEN JULY, 1908

1. Fire Island. 2. Castle Island. Perry has disappeared and a high ridge of land has been formed between the two islands. All three photos taken with Perry Peak bearing southwest. Photos from Capt. F. M. Munger.



D. PHOTO TAKEN JULY 4, 1907, WITH THE PEAKS BEARING NORTHWEST

1. Perry Peak. 2. McCulloch Peak

E. PHOTO TAKEN JULY 4, 1907, WITH THE PEAKS BEARING SOUTHWEST

1. McCulloch Peak. 2. Perry Peak. Two months after these photos were taken McCulloch Peak exploded and its ashes were scattered on the islands to the southeast for a distance of 70 miles. At Unalaska, 60 miles away, there fell 3/16 of an inch in one hour, then followed a fierce rain. Photos from Capt. F. M. Munger.

The navigator of the *Rush* made a survey of the harbor and found it to be about one mile across, with from four to twenty-five fathoms of water; black sand bottom; temperature of water, 46 F. The shore to the south of the harbor was steaming (photographs C., F., and sketch).

9. In September, 1908, the *McCulloch* visited the island and found the southwest portion smoking; shoals had made out from the northeast and east sides, and patches of discolored water were observed to the north and northwest. Bad weather and rough sea prevented further survey.

10. The following relative to formation is quoted from the report of First Lieutenant B. H. Camden, U. S. R. C. S., who surveyed the island July 4, 1907:

"The formation consists of disintegrated rock, basalt, feldspar, scoria, tufa, pumice, obsidian, trachyte, other igneous rock, and volcanic mud, all more or less discolored with a deposit of sulphur."

SOLAN GEESE FLYING THROUGH THE STEAM AND FUMES OF PERRY PEAK

They breed on Fire Island, from which this view of Perry Peak was taken in July, 1966, by Robert Dunn

SEA LIONS DISPORTING ON CASTLE ISLAND

Here, on the old portion of Bogoslof Island, they rear their offspring utterly indifferent of the frequent convulsions of nature occurring within a few hundred yards. Photo by Robert Dunn

CONDITIONS IN CUBA AS REVEALED BY THE CENSUS*

By Henry Gannett

IN the autumn of 1907 a census of the population of Cuba was taken. The primary purpose of this census was to obtain, by means of non-partisan machinery, a list of the persons qualified to vote, to serve as a basis for the then approaching municipal and national elections. Because such was the primary purpose, the census was not extended to include the industries of the island, but related solely to the population. The questions asked differed but little from those employed in the Cuban census of 1899 and in the census of the Philippines.

The results of this census were tabulated by the United States Census Office and a report, printed in Spanish only, is about to be issued. From the results I have brought together a few of the more striking facts.

The civil organization of Cuba is as follows:

The island is divided into 6 provinces, and these provinces into 82 municipalities. These municipalities are in turn divided into 1,069 barrios, the "barrio" being the smallest political subdivision of the island. There are no cities, towns, villages, or boroughs, as we understand those terms. The urban parts of the municipalities are not separated from the adjoining rural parts. It is possible, however, in the case of most centers of population, to make an approximate separation by means of the barrios, certain of the barrios of a municipality being composed mainly, if not entirely, of urban or of rural inhabitants.

A REMARKABLE NATURAL INCREASE IN POPULATION

The population of Cuba on September 30, 1907, was 2,048,980; at the census next preceding, taken under American administration, in 1899, at the close of the Spanish-American War, the population was 1,572,797.

The rate of increase in these eight years is not less than 30 per cent, or at the rate of 39 per cent per decade. This is a very rapid rate of increase—greater than that of any country with which I am acquainted.

This increase has not been brought about by immigration, for in the eight years the net immigration (that is, the excess of arrivals over departures) numbered only 75,000, and the element of foreign birth increased from 11 per cent to 11.2 per cent only, but it has been brought about almost entirely by the excess of births over deaths. During the years of revolution, when a large part of the men were away from their homes fighting for freedom, marriages and births were very few, and at the close of the war there were great arrears to be made up. The natural result followed—an astonishing birth rate, which is shown in the fact that by the last census the number of children under five years of age, who, of course, have been born since the war, accounts for three-fourths of the increase in population.

One peculiar phenomenon of this increase is that the rural population has gained much more rapidly than has the urban—a condition which rarely exists, as in nearly every country in the world the drift of population is toward the cities.

The urban population, including all places of 1,000 inhabitants and over, was 43.9 per cent of the total population. In 1899 it was 47.1 per cent. If the urban population be limited to towns of 8,000 inhabitants, the proportion was 30.3 per cent. The chief cities are Habana, with 297,159 inhabitants, or about one-seventh

*Paper read before the American Association of Geographers, January 2, 1909.

of the population of Cuba; Santiago de Cuba, 45,470; Matanzas, 36,009; Cienfuegos, 30,100; and Camaguey, 29,616. The number of inhabitants per square mile in the island as a whole was 46.5, or about the same as in Missouri, Virginia, or South Carolina.

The foreign-born population formed 11.2 per cent of the total. Of this element, four-fifths were born in Spain and less than 3 per cent in the United States; Chinese and Africans were more numerous than United States people. The slave trade was officially abolished early in the present century, but that it continued as a contraband traffic until comparatively recent years is shown by the fact that nearly 8,000 negroes on the island reported themselves as having been born in Africa.

Among the people born in Cuba the sexes were very nearly equally divided, while among the foreign-born more than four-fifths were males.

THE COLORED POPULATION IS NOT HOLDING ITS OWN

As to color, about seven-tenths of the population were white, the remaining three-tenths being colored, including negroes, mixed, and a few thousand Chinese. As in the United States, the colored element is increasing less rapidly than is the white population, owing here both to a smaller birth rate and a larger death rate. The native whites formed nearly three-fifths of the entire population.

Some of the features of the distribution by age are of interest. The proportion of young children, as has already been noted, was very large, those under 1 year forming 3.2 per cent of the whole population, while in the United States they formed only 2.5 per cent. Those under 5 years of age were 16.8 per cent, contrasting with 9.5 per cent in the United States. On the other hand, the proportion of people of advanced age was small; those over 50 years of age formed only 10 per cent, while in the United States the percentage was 13.2 per cent.

The children of school age, 5 to 17 years, present a curious phenomenon, the number being actually 11,500 less in this census than in that of 1899. The war and the accompanying reconcentration caused the death of vast numbers of young children, most of whom were under the school age. The survivors are now 8 years older and constitute a large proportion of the school-age class, while the numerous children born since the war have hardly reached the school age. At the recent census the children of school age formed only 26.4 per cent of the population, while the same class in 1899 was not less than 35.1 per cent, and in the United States was 33.8 per cent.

Among the aged there is apparently the same tendency to exaggerate ages as exists in this country and elsewhere, and this tendency is of course more marked among the ignorant classes. In Cuba 0.2 per cent of the whites reported themselves as 80 years of age or more, while of the colored not less than 1.2 per cent were so reported. Of the white population who reported themselves to be over 100 years, the number was too small to be expressed in a percentage, but of the colored 0.1 per cent reported themselves as centenarians.

The average age of the Cuban was 23.4 years, which is strongly contrasted with that of the United States—26.3 years—a difference of almost 3 years in average age. The males of voting age formed 27 per cent of the population, or very nearly that of the United States, which is 28 per cent. The native-born males of voting age, who practically constitute the voting strength of the people, formed 21 per cent of the population.

MARRIAGES IN CUBA

The conjugal condition of the Cubans presents some points of interest. There are practically no divorced persons, since the Roman Catholic Church does not tolerate that condition. There is a class, however, which is not recognized in this country, to which the name of "consensual union" or "consensual marriage"

has been applied, referring to man and woman living together, having waived the marriage ceremony. The reason for this condition is the large fee demanded by the church for performing the marriage ceremony, which the poorer class is unable to pay. This class of consensually married persons is found in most Spanish-speaking countries, but it is probably larger in Cuba than elsewhere, being 8.8 per cent of the population, while the proportion of legally married was 20.7 per cent. This proportion, whether we consider only the legally married, 20.7 per cent, or both kinds of marriages together, 29.5 per cent, was much smaller than in most countries, and contrasts strongly with the proportion in the United States, 36.5 per cent. Consensual marriages were vastly more common among the colored than among the white inhabitants. Of the whites, 25.6 per cent of the total were legally married and but 4.8 per cent were consensually married, while among the colored people less than 10 per cent were lawfully married, while 17.4 were consensually married.

It is popularly supposed that Cubans, like all Latin races, marry young, but as far as the figures show they marry but little, if any, younger than the people of the United States. The single persons comprised 66.8 per cent, or about two-thirds of the total, and the widowed 3.9 per cent. In classifying the single persons by age it appears that the proportion reaches a minimum in middle life and then increases. This is a result of consensual marriage, for as one partner of such a union dies the survivor enters the ranks of the single instead of the widowed.

EXCELLENT PROGRESS IN EDUCATION

The public-school system, organized under the first intervention in Cuba, is producing excellent results. Of the population 10 years of age and over, 56.6 per cent could read, showing a decided gain in that respect since 1899. Of the native whites, 58.6 per cent could read, and of the colored 45 per cent were similarly educated. The proportion of literates was naturally much greater in the cities than in the country, and highest of all in Habana.

Of the whole population, 37.7 per cent were wage-earners—a proportion but slightly less than in the United States, where it was 39 per cent. Of all males, 65 per cent were wage-earners, and of females, only 7.5 per cent. Child labor was prevalent; of boys between 10 and 14 years of age, 27.8 per cent were wage-earners, and of those between 15 and 19 years, not less than 87.1 per cent, or about seven-eighths.

By distributing wage-earners among certain great groups of avocations, one gets an idea of the relative importance of the industries which they represent. Thus, farming, fishing, and mining, collectively, employed 48.5 per cent, or nearly one-half of the wage-earners; domestic and personal service claimed 16 per cent; manufacturing and the mechanic arts, 16.3 per cent; trade and transportation, 17.6 per cent, or about one-sixth each; and the professions claimed 1.6 per cent. It appears that trade and transportation, manufacturing, and domestic and personal service employed about equal numbers, and collectively they claimed about the same number as farming, fishing, and mining.

A WASTEFUL NATION

BILLIONS of dollars are thrown away each year by the American people, according to the first report of the Conservation Commission, submitted to President Roosevelt on January 22, 1909. The report contains an impressive series of figures, which have been prepared very carefully by the most expert authorities of the United States government and may be regarded as conservative.

The following paragraphs are reprinted from the report for the information of the readers of this Magazine. The figures are so extraordinary that they need no comment:

The mineral production of the United States for 1907 exceeded $2,000,000,000, and contributed 65 per cent of the total freight traffic of the country. The waste in the extraction and treatment of mineral products during the same year was equivalent to more than $300,000,000.

The production for 1907 included 395,000,000 tons of bituminous, and 85,000,000 tons of anthracite coal, 166,000,000 barrels of petroleum, 45,000,000 tons of high-grade and 11,000,000 tons of low-grade iron ore, 2,500,000 tons of phosphate rock, and 869,000,000 pounds of copper. The values of other mineral products during the same year included clay products, $162,000,000; stone, $71,000,000; cement, $56,000,000; natural gas, $50,000,000; gold, $90,000,000; silver, $37,000,000; lead, $39,000,000, and zinc, $26,000,000.

OUR IRON ORE SUFFICIENT FOR 50 YEARS ONLY

The available and easily accessible supplies of coal in the United States aggregate approximately 1,400,000,000,000 tons. At the present increasing rate of production this supply will be so depleted as to approach exhaustion before the middle of the next century.

The known supply of high-grade iron ores in the United States approximate 3,840,000,000 tons, which at the present increasing rate of consumption cannot be expected to last beyond the middle of the present century. In addition to this, there are assumed to be 59,000,000,000 tons of lower-grade iron ores, not available for use under existing conditions.

The supply of stone, clay, cement, lime, sand, and salt is ample, while the stock of the precious metals and of copper, lead, zinc, sulphur, asphalt, graphite, quicksilver, mica, and the rare metals cannot well be estimated, but is clearly exhaustible within one to three centuries.

The known supply of petroleum is estimated at 15,000,000,000 to 20,000,000,000 barrels, distributed through six separate fields having an aggregate area of 8,900 square miles. The production is rapidly increasing, while the wastes and the loss through misuse are enormous. The supply cannot be expected to last beyond the middle of the present century.

The known natural-gas fields aggregate an area of 9,000 square miles, distributed through 22 States. Of the total yield from these fields during 1907, 400,000,000,000 cubic feet, valued at $62,000,000, were utilized, while an equal quantity was allowed to escape into the air. The daily waste of natural gas—the most perfect known fuel—is more than 1,000,000,000 cubic feet, or enough to supply every city in the United States of more than 100,000 population.

OUR WASTE IS ON THE INCREASE

The consumption of nearly all our mineral products is increasing far more rapidly than our population. In many cases the waste is increasing more rapidly than the number of our people. The consumption of coal is over 5 tons and the waste nearly 3 tons per capita.

At the beginning of our mineral development the coal abandoned in the mine was two or three times the amount taken out and used. Now the mine waste averages little more than half the amount saved. The chief waste is in imperfect combustion in furnaces and fire boxes. Steam engines utilize on the average about 8 per cent of the thermal energy

of the coal. Internal-combustion engines utilize less than 20 per cent, and in electric lighting far less than 1 per cent of the thermal energy is rendered available.

Some lignites and other low-grade coals are readily gasified, and, through the development of internal-combustion engines, check the consumption of high-grade coals. Peat is becoming important; it is estimated that 14,000,000,000 tons are available in the United States. Its value is enhanced because of distribution through States generally remote from the fields of coal, oil, and natural gas.

The building operations of the country now aggregate about $1,000,000,000 per year. The direct and indirect losses from fire in the United States during 1907 approximated $450,000,000, or one-half the cost of construction. Of this loss four-fifths, or an average of $1,000,000 per day, could be prevented.

There is urgent need for greater safety to the miner. The loss of life through mine accidents is appalling, and preventive measures cannot be taken too soon.

The national government should exercise such control of the mineral fuels and phosphate rocks now in its possession as to check waste and prolong our supply.

The total land area of continental United States is 1,900,000,000 acres. Of this but little more than two-fifths is in farms, and less than one-half of the farm area is improved and made a source of crop production. We have nearly 6,000,000 farms; they average 146 acres each. The value of the farms is nearly one-fourth the wealth of the United States. The number of persons engaged in agricultural pursuits is more than 10,000,000.

We grow one-fifth of the world's wheat crop, three-fifths of its cotton crop, and four-fifths of its corn crop. We plant nearly 50,000,000 acres of wheat annually, with an average yield of about 14 bushels per acre; 100,000,000 acres of corn, yielding an average of 25 bushels per acre, and 30,000,000 acres of cotton, yielding about 12,000,000 bales.

We had on January 1, 1908, 71,000,000 cattle, worth $1,250,000,000; 54,000,000 sheep, worth $211,000,000, and 56,000,000 swine, worth $339,000,000. The census of 1900 showed $137,000,000 worth of poultry in this country, which produced in 1899 293,000,000 dozen eggs.

There has been a slight increase in the average yield of our great staple farm products, but neither the increase in acreage nor the yield per acre has kept pace with our increase in population.

THE YIELD PER ACRE MUCH LESS THAN IN ENGLAND AND GERMANY

In addition to the land awaiting the plow 75,000,000 acres of swamp land can be reclaimed, 40,000,000 acres of desert land irrigated, and millions of acres of brush and wooded land cleared. Our population will increase continuously, but there is a definite limit to the increase of our cultivated acreage. Hence we must greatly increase the yield per acre. The average yield of wheat in the United States is less than 14 bushels per acre, in Germany 28 bushels, and in England 32 bushels. We get 30 bushels of oats per acre, England nearly 45, and Germany more than 47.

The loss to farm products due to injurious mammals is estimated at $130,000,000 annually; the loss through plant disease reaches several hundred million dollars and the loss through insects is reckoned at $659,000,000. The annual losses from disease among domestic animals are: Horses, 1.8 per cent; cattle, 2 per cent; sheep, 2.2 per cent, and swine, 5.1 per cent. Most of these farm losses are preventable.

The product of the fisheries of the United States has an annual value of $57,000,000. Fish culture is carried on by the nation and the States on an enormous scale. Most of the more important food species are propagated. Fish from forest waters furnish $21,000,000 worth of food yearly.

Our wild game and fur-bearing animals have been largely exterminated. To prevent their complete extinction the States and the United States have taken

in hand their protection, and their numbers are now increasing. Forest game yields over $10,000,000 worth of food each year.

Each citizen of the United States owns an equal undivided interest in about 375,000,000 acres of public lands, exclusive of Alaska and the insular possessions. Besides this there are about 235,000,000 acres of national forests, national parks, and other lands.

Good business sense demands that a definite land policy be formulated. The national conservation commission believes that the following will serve as a basis therefor:

1. Every part of the public lands should be devoted to the use which will best subserve the interests of the whole people.

2. The classification of all public lands is necessary for their administration in the interests of the people.

3. The timber, the minerals, and the surface of the public lands should be disposed of separately.

4. Public lands more valuable for conserving water supply, timber, and natural beauties or wonders than for agriculture should be held for the use of the people from all except mineral entry.

5. Title to the surface of the remaining non-mineral public lands should be granted only to actual home-makers.

6. Pending the transfer of title to the remaining public lands they should be administered by the government and their use should be allowed in a way to prevent or control waste and monopoly.

The present public land laws as a whole do not subserve the best interests of the nation. They should be modified so far as may be required to bring them into conformity with the foregoing outline of policy.

WASTE IN FORESTS

We take from our forests yearly, including waste in logging and in manufacture, 23,000,000,000 cubic feet of wood. We use each year 100,000,000 cords of firewood; 40,000,000,000 feet of lumber; more than 1,000,000,000 posts, poles, and fence rails; 118,000,000 hewn ties; 1,500,000,000 staves; over 133,000,000 sets of heading; nearly 500,000,000 barrel hoops; 3,000,000 cords of native pulp wood; 165,000,000 cubic feet of round mine timbers, and 1,250,000 cords of wood for distillation.

Since 1870 forest fires have destroyed a yearly average of 50 lives and $50,000,000 worth of timber. Not less than 50,000,000 acres of forest is burned over yearly. The young growth destroyed by fire is worth far more than the merchantable timber burned.

One-fourth of the standing timber is lost in logging. The boxing of long-leaf pine for turpentine has destroyed one-fifth of the forests worked. The loss in the mill is from one-third to two-thirds of the timber sawed. The loss of the mill product in seasoning and fitting for use is from one-seventh to one-fourth.

Of each 1,000 feet which stood in the forest, an average of only 320 feet of lumber is used.

We take from our forests each year, not counting the loss, three and a half times their yearly growth. We take 40 cubic feet per acre for each 12 cubic feet grown; we take 260 cubic feet per capita, while Germany uses 37 and France 25 cubic feet.

We tax our forests under the general property tax, a method abandoned long ago by every other great nation. Present tax laws prevent reforestation of cut-over land and the perpetuation of existing forests by use.

To protect our farms from wind and to reforest land best suited for forest growth will require tree planting on an area larger than Pennsylvania, Ohio, and West Virginia combined.

An annual tax upon the land itself, exclusive of the value of the timber, and a tax upon the timber when cut, is well adapted to actual conditions of forest investment, and is practicable and certain.

Under right management, our forests will yield four times as much as now. We can reduce waste in the woods and in the mill at least one-third, with present as well as future profit. We can perpet-

uate the naval stores industry. We can practically stop forest fires at a cost yearly of one-fifth the value of the merchantable timber burned.

WATER POWER NEGLECTED

The sole source of our fresh water is rainfall, including snow. Our mean annual rainfall is about 30 inches; the quantity about 215,000,000,000,000 cubic feet per year, equivalent to ten Mississippi Rivers.

Of the 70,000,000,000,000 cubic feet annually flowing into the sea, less than 1 per cent is restrained and utilized for municipal and community supply; less than 2 per cent (or some 10 per cent of that in the arid and semi-arid regions) is used for irrigation; perhaps 5 per cent is used for navigation, and less than 5 per cent for power.

The water power now in use is 5,250,000 horse power; the amount running over government dams and not used is about 1,400,000 horse power; the amount reasonably available equals or exceeds the entire mechanical power now in use, or enough to operate every mill, drive every spindle, propel every train and boat, and light every city, town, and village in the country.

SAVING OF LIVES

Since the greatest of our national assets is the health and vigor of the American people, our efficiency must depend on national vitality even more than on the resources of the minerals, lands, forests, and waters.

The average length of human life in different countries varies from less than 25 to more than 50 years. This span of life is increasing wherever sanitary science and preventive medicine are applied. It may be greatly extended.

Our annual mortality from tuberculosis is about 150,000. Stopping three-fourths of the loss of life from this cause and from typhoid and other prevalent and preventable diseases, would increase our average length of life fifteen years.

There are constantly about 3,000,000 persons seriously ill in the United States, of whom 500,000 are consumptives. More than half this illness is preventable.

If we count the value of each life lost at only $1,700, and reckon the average earning lost by illness as $700 a year for grown men, we find that the economic gain from mitigation of preventable disease in the United States would exceed $1,500,000,000 a year. This gain, or the lengthening and strengthening of life which it measures, can be had through medical investigation and practice, school and factory hygiene, restriction of labor by women and children, the education of the people in both public and private hygiene and through improving the efficency of our health service, municipal, State, and national.

The permanent welfare of the nation demands that its natural resources be conserved by proper use. To this end the States and the nation can do much by legislation and example. By far the greater part of these resources is in private hands. Private ownership of natural resources is a public trust; they should be administered in the interests of the people as a whole The States and the nation should lead rather than follow in the conservative and efficient use of property under their immediate control. But their first duty is to gather and distribute a knowledge of our natural resources and of the means necessary to insure their use and conservation, to impress the body of the people with the great importance of the duty, and to promote the coöperation of all. No agency, State, Federal, corporate, or private, can do the work alone.

WALTHAM WATCHES

The Waltham Factory the Pioneer

¶ The Waltham Watch Company is the Oldest Watch Company on the American continent, the Waltham factory having been built in 1854. The only other watch company that at all approaches it in age and continuous existence was an off shoot from the parent Waltham factory and was established in a Western State in 1864.

The Largest in the World

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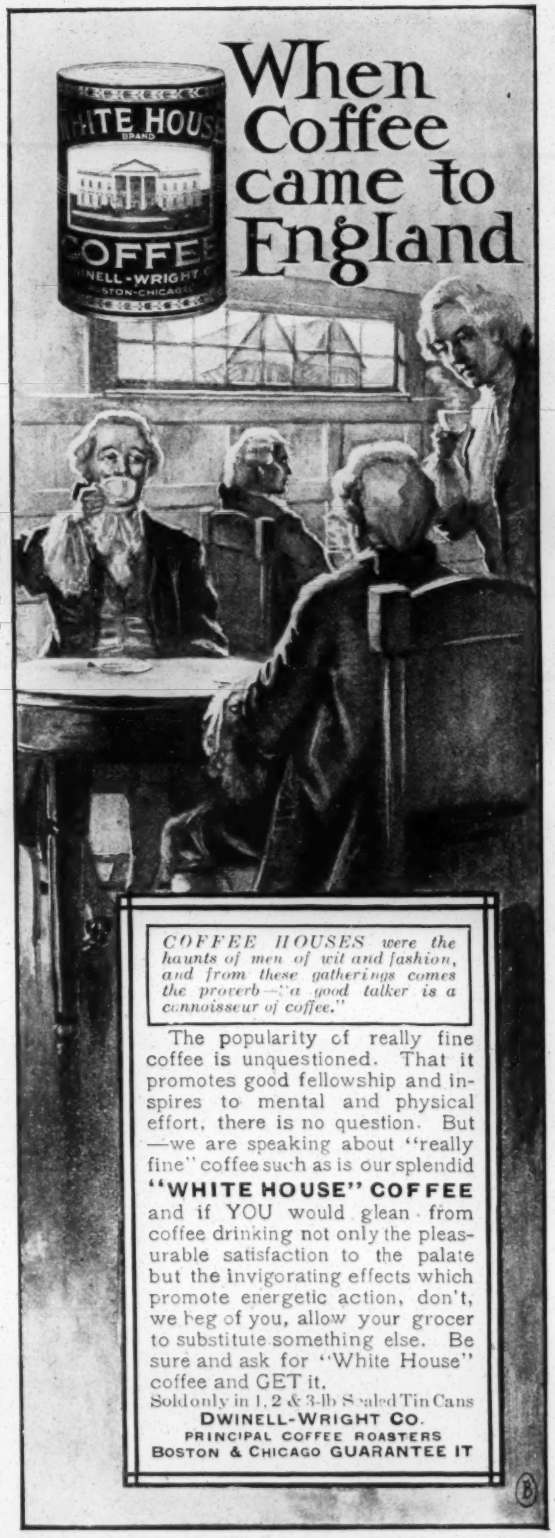

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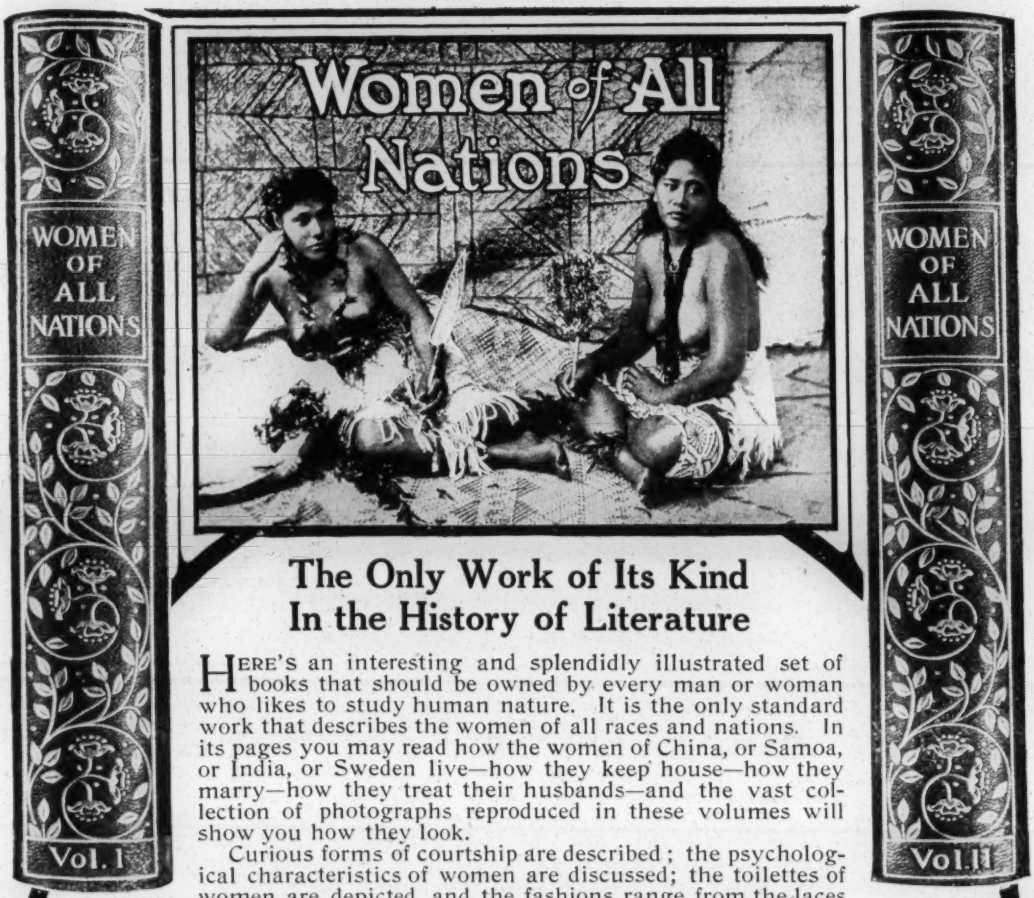

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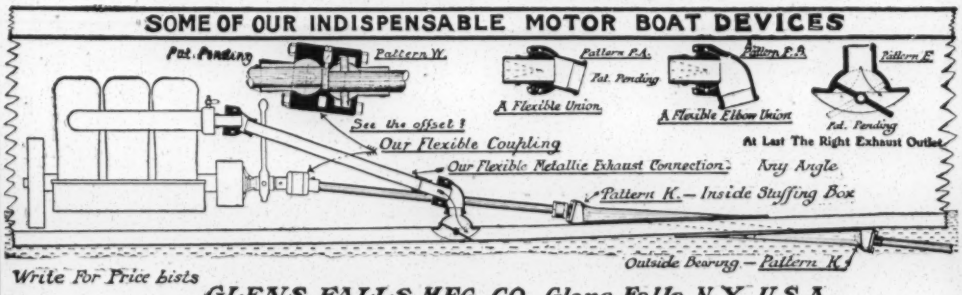

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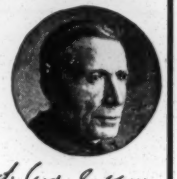

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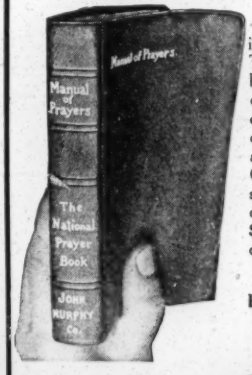

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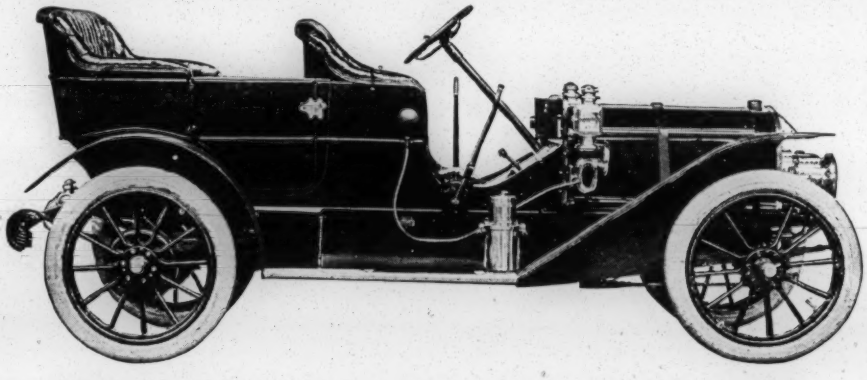

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